Change process beyond goals: The client in the context of the working alliance in coaching

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CHANGE PROCESS BEYOND GOALS: THE CLIENT IN THE CONTEXT OF THE WORKING ALLIANCE IN COACHING

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad Doctor of Philosophy aan
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op gezag van de rector magnificus
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Tünde Erdös

geboren te Odorheiu Secuiesc, Roemenië

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Table 2.2. Summary table of primary qualitative studies reviewed in the qualitatitive meta-synthesis

Type of study - Case Study - Title	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
The 'Aha' Moment in Co-Active Coaching and its Effects on Belief and Behavioural Changes	Longhurst, L. (2006)	International Journal of Evidence Based Coaching and Mentoring	20 coaches / 12 co-active coaches & 30 past coachees	phenomenological / grounded theory	aha moment facilitated by metaphor through the bodymind (energies trapped in the meridian system), & subconscious emotional ease or discomfort & capacity for non-judgemental self-examination & body experiences (felt in the heart, chest, stomach, gut, solar plexus, or as a sudden rush of energy throughout the body) & mind experiences (change in perspectives, beliefs, self-talk, decision-making powers, clarity of ideas) & felt experiences (relief, peace, calm, and often excitement and an 'inner knowing' or intuition) & soul experiences (inner knowing: moving from dependence to autonomy, passivity to activity, subjectivity to objectivity and selfishness to altruism) & spiritual experiences (inner knowing) & non-dual experiences
Stepping off the treadmill: A study of coaching on the RCN Clinical Leadership Programme	MacKenzie, H. (2007)	International Journal of Evidence Based Coaching and Mentoring	8 leaders	phenomenological	sense of urgency and immediacy impacting on the implementation of insights gained through coaching, anxieties at outset of coaching relationshhip, carrying unresolved emotions, confidence in intentions of the coach; influenced by clients' anxieties (daunted, uncertain) & being out of the comfort zone & beliefs and perceptions & contextual understanding & attitude clients have towards themselves (confidence) & clients' perception of their professional culture; influenced by willingness to work with courage and manage own fears & openness to challenge & being wholly present & respect for coach & feeling safe (safe environment) & confidence in intentions and capabilities of coach & capacity to realise enabling character of coaching
Coaching the narcissist: how difficult can it be?	Mansi, A. (2009)	The Coaching Psychologiy	1 case	phenmenological	dark side of personality, e.g, narcisism in leaders and core issues that coaches may face; narcissist resistant to coaching, particularly towards those aspects which challenge the person's self view
The critical factors of coaching practice leading to successful coaching outcomes	Marshall, M.K. (2007)	Dissertation	66 participants / 19 coaches interviewed	phenmenological	personal philosophies influencing breakdown or success, therapeutic issues, coach/client mismatch, lack of willingness or ability to take action and make commitments, unrealistic expectations, negative mindsets that could not be shifted, factors that lead to success are client connection, client accountabiliity, openness and motivation
The voice of leadership: Critical success factors of executive women	Martell, N.G. (2005)	Dissertation	large scale study	grounded theory	critical success factors (passion, support, balance and caring) as factors to aid the identification and retention of women
Executive coaching and self- efficacy: A study of goal-setting and leadership capacity	Minski C.A. (2014)	Dissertation	20 executive coaches	phenmenological	coaches mention those high in self-efficacy are open to feedback; coaches see high self-efficacy as beneficial to achieving significant goals in workplace; coaches view self-efficacy as important to goal achievement; coaches note that leaders need a safe place to admit their level of efficacy; as coach is building a relationship, understanding the client's-efficacy was important; coaches describe self-efficacy as confidence
Presence in executive coaching conversations: The C2 model	Noon, R. (2018)	International Journal of Evidence Based Coaching and Mentoring	focus groups / 3 coaches & 3 coachees	phenomenological	each person's presence affecting the other; subjective, objective and relational experiences are part of interdependent, holistic whole; conditions that contributed to deepening presence were reported to include client and coach attitudes of openness, compassion, respect and empathy; a requirement for practice; the value of experience; and a conducive physical environment (which may include face-to-face or non-physical contexts); also involved intentional decisions and actions during coaching conversation (improving posture, focussing on breath, feeling grounded, making eye contact and allowing time at beginning of session for both to become present); conditions link topresence as a way of being that can be practiced, cultivated and learnt
Exploring key aspects in the formation of coaching relationships: initial indicators from the perspective of the coachee and coach	O'Broin,A. Palmer , S. (2010c)	Coaching: An International Journal of Theory, Research and Practice	6 coaches, 6 coachees	phenmenological	trust as key aspect of bonding and engagement & coach's attributes as well as coach's self-awareness and awareness of coachee
A grounded theory study of the coachee experience: The implications for training and practice in coaching psychology	Passmore, J. (2010)	International Coaching Psychology Review	6 coachees / directors / 3 male & 3 female	grounded theory	results suggest that coachees seek not only particular behaviours but also certain personal attributes in coach. Key behaviours identified were common sense confidentiality, being collaborative, setting take-away tasks, balancing challenge and support, stimulating problem- solving, effective communication, staying focused, containing emotions, helping develop alternative perspectives, use of a variety of focusing tools and techniques and use of self

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Type of study - Case Study - Title	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
Transfer of training: Reported perceptions of participants in a coaching study in six organizations	Sawczuk, M.P. (1996	Dissertation	6 organizations	phenmenological	participants' perception of the coaching model influence their behaviour
Understanding the importance of gender and leader identity formation in executive coaching for senior women	Skinner, S. (2014)	Coaching: An International Journal of Theory, Research and Practice	11 coachees / female	grounded theory	several enabling factors that contributed to leader identity formation and helped to mitigate impact of male norms of leadership evident at senior levels. These included coach as role model, managing motivation at senior levels and leading with authenticity; coaching process provided contextual support for identity formation, via engagement in regular dialogue and reflection; as a result senior women became more able to authentically identify themselves as leaders, developing a deep sense of self, being clear about personal values and beliefs, and finding ways to sustain their leadership roles in the long term
Investigating the role of the active ingredients in executive coaching	Smith, I.M. & Brummel, B.J. (2013)	An International Journal of Theory, Research and Practice	30 executives	phenmenological	active ingredients: executive involvement, perceptions of developability leads to higher competency change
The nature of executive coaching: An exploration of the executive's experience	Sztucinksi, K. (2002)	Dissertation	7 executives (5 males, 2 females)	phenmenological	Path to Achievement: openness to coaching due to motivation to get promoted, need to figure out what was in the way of performance: fear of failure, authority of boss as role model); Ownership: choice, sense of control of content and rules governing sessions, exclusivity, willingness and readiness to confront self and reflect), Array of Emotion: trust, relaxation, ability to stay with discomfort, turbulence, vulnerability; Bond with Coach: trust in coach, feeling comfortable disagreeing with coach, desire to please coach, personal chemistry, all: high regard for and strong bond with coach; Outcome: Goal Accomplishment, (2) Enhanced Self-Esteem, (3) Change in Focus, (4) Insight/Self Awareness, (5) On-Going Growth and (6) Better Executive.
Coaching as second-order observations: Learning from site managers in the construction industry	Styhre, A. (2008)	Leadership & Organization Development Journal	6 managers	phenmenological	social context impacts learning; capactiy to reflect and self-observe impacts on behaviour; that is the ability for both to achieve a deep level of psychological reflection and understanding lead to transfer of learning and behavioural change
"If I learn do we learn?": The link between executive coaching and organizational learning.	Swart, J., & Harcup, J. (2013)	Management Learning	23 stakeholders: coachees, their team members (as observers of the coachees), their coaches, and representatives of management	phenmenological	translation from individual learning into collective learning, i.e. enacting behaviours, enacting a coaching approach and embedding collective learning processes; data gathered in two law firms wherein learning was the result of executive coaching interventions to pinpoint the mechanisms by which individual and collective learning is interconnected, thereby heeding a call for a more detailed understanding of the mechanisms of learning presented
Designing a coaching intervention to support leaders promoted into senior positions	Terblanche, N., Albertyn, R. M., & Coller-Peter, S. (2017)	SA Journal of Human Resource Management	16 leaders	grounded theory	coach-coachee matching impacts opens up reflection; reflection used in various ways including obtaining clarity of thinking, identifying alternative solutions, feeling unjudged, and creating awareness of positive thoughts; distinction between assisted reflection, led by the coach and self-reflection, performed by coachee outside of coaching sessions; reflection to close the active experimentation learning loop; organisational conditions and circumstances impact clients' capacity to learn and implement learning effectively
Exploring what clients find helpful in a brief resilience coaching program: A qualitative study	Timson, S. (2015)	The Coaching Psychologist	6 coachees	phenmenological	pressured working environment; time and space; and coaches; fact of moving forward impact on resilience in coaching; Participants highlighted pressured environment under which they were working and value of tools and techniques that they had learnt which helped them move forward; the value of time and space that coaching sessions gave them, and how important independent supportive relationship with coaches had been.
Strengthening coaching: An exploration of the mindset of executive coaches using strengths-based coaching	Toogood, K. (2012).	International Journal of Evidence Based Coaching and Mentoring	6 coachees	phenomenological	conscious awareness of coaches leads to faster growth; coach's authenticity and alignment, identity and sense of values and self and 'it makes intuitive sense' lead to self-actualising; flexibility and capacity of use of self build confidence, self-belief and identity; these elements all seem to be important for both coach and client

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Preface

The motivation to start doing scientific work and write a thesis paper was born out of a critical moment that I experienced in my executive coaching practice sometime around late 2016. I call that moment critical as it felt like a failure to me. I become aware that despite a well-established career as an accredited executive coach there was still something apparently 'critical' that I did not quite understand about the impact that my physicality was having on an executive client of mine. I became aware of my 'not knowing' as I received instantaneous feedback from my client who found my nonverbal responses through my movements not to be congruent with what I was saying in a coaching session, which she described as 'feeling unsafe'. That critical moment ignited my curiosity to look into better understanding the relevance of movement between coach and client, how coach and client nonverbally synchronize, and how the quality of the coach-client relationship influences nonverbal synchrony and client's capacity to feel safe. I was also intrigued by how clients contribute to how they can feel safe in coaching as not each client would be vocal, ready and apt enough to express the way they felt about their coach's nonverbal responses. At the outset of my research work, I became aware that I was tapping into unchartered territory in coaching with very little knowledge I could use to navigate my 'not knowing'. The biggest challenge in navigating my journey from 'not knowing' to 'knowing that knowing does not help but continued curiosity does', was meeting serendipity in the research process. Serendipity is when we reveal what we did not expect to find in research and I learned to appreciate it as the most effective and valuable contribution in research. I felt 'at home' with that learning as coaching is inherently about working with 'not knowing' how we can support our client's effectiveness too, regardless of the validity of our methods, techniques, and level of education or years of experience. This realization inspired me to ensure that whatever serendipity would finally reveal to me in research would eventually manifest in peer-reviewed journal articles.

Chapter 1. Introduction

1.1 Purpose

Nowadays, the working environment and its associated challenges require leaders, staff and entire organizations to constantly adapt to a world that is volatile, uncertain, complex and ambiguous (VUCA; Kingsinger & Walch, 2012). The same holds true for coaching as an effective learning-based intervention in organizations (Terblanche et al., 2017; Lueneburger, 2012; Salomaa & Mäkelä, 2017). Coaching is subject to fluctuations of the attributes of the coach, the client, the coach-client relationship and various contextual factors (Cox, Bachkirova, & Clutterbuck, 2014). This position draws on ideas from social cognitive psychology postulating that coaches work amid bounded instability: the paradoxical state of harmony and conflict, regularity and unpredictability, stability and instability (Stacey, 2011). Specifically, sport coaching (Bowes & Jones, 2006) describes coaches as working "on the edge of chaos" (Bowes & Jones, 2006, p. 235). Although sport coaching differs from the contextualization of the present study in that the 'field of play' is more volatile, complex and uncertain in career, business and leadership contexts, both fields share a common feature: coaches support clients through a self-regulatory cycle toward the highest level of performance possible.

Despite the prominence and the wide availability of coaching services in and outside of organizational settings to support clients in how to feel capacitated to adapt to change in times of persistent economic pressure (Athanasopoulou & Dopson, 2018; Bozer & Jones, 2018; Grover & Furnham, 2016; Jones, Woods, & Guillaume, 2016a), we still do not fully understand the *process* of how coaching produces learning for clients over the course of the coaching engagement (Molyn, de Haan, Stride, & Gray, 2019). We do not fully understand client's change process, which is unfortunate as coaching scholars (e.g., Bachkirova, 2017; Cavanagh & Lane, 2012; Cox, 2013) claim that studying coaching as a change process is important for coaches to support clients effectively in navigating the complex and fluid nature of goal striving

and goal attainment in their VUCA world. Unless we gain deeper understanding of how coaches need to work on the 'edge of chaos in change', practitioners will be unable to support their change processes effectively, which may come at a cost to client's trust in coaching and coach's reputation in a world that is seeking ever more effective means to deal with change moments. Therefore, the purpose of this thesis is to look into coaching as a purposeful goal-directed change intervention (Grant, 2003, 2012). In this context, coaching is viewed as a non-linear process with the client, the coach and the coach-client relationship as self-organizing characteristics emerging dynamically as coach and client interact with each other. In studying the fluctuating attributes of these characteristics, the goal is to enhance our understanding of how coaching works as a change process regardless of the methodical approach selected in coaching (Bachkirova & Lawton Smith, 2015).

1.2 Landscaping coaching process research and practice

Process research focuses on "the interaction between coach and client within a single session of coaching and / or across a series of coaching sessions" (Myers, 2017, p. 590) in order to describe and analyze coach-client interactions. First attempts to investigate coaching as a change process comprise both quantitative (hypothesis testing) or qualitative (descriptive) studies (Llevelyn & Hardy, 2001). As such, these have largely drawn on psychotherapy research as a rich resource of possible variables, methods, tools, and techniques to design investigations in coaching process research arguing that there are sufficient similarities between psychotherapy and coaching for the literature on therapeutic process research to be considered in coaching (Peltier, 2011; McKenna & Davis, 2009; de Haan, Duckworth, Birch, & Jones, 2013). In particular, common factors, that is parameters which are common to both types of intervention, have been convincingly argued to be relevant in psychotherapy literature (Wampold, 2001) and thus have been transferred and adapted to coaching process research.

On the one hand, most hypothesis-testing process studies in coaching tested factors common to psychotherapy and coaching such as the coach-client relationship (e.g., de Haan et al., 2013; de Haan, Grant, Eriksson, & Burger, 2016), coach-client fit (e.g., Boyce, Jackson, & Neal, 2010; Bozer, Joo, & Santora, 2015), coach/client characteristics (e.g., Lai & McDowall, 2014; Jones, Woods, & Hutchinson, 2014) and goal orientation (e.g., Bozer, Sarros, & Santora, 2013; Grant, 2012a). However, these studies explored common factors mostly using an input-output design rather than as interactional processes. Only five studies (Gessnitzer & Kauffeld, 2015; Ianiro & Kauffeld, 2014; Ianiro, Lehmann-Willenbrock, & Kauffeld, 2015; Ianiro, Schermuly, & Kauffeld, 2013; Schermuly & Scholl, 2012) appear to have looked into the change process as moment-to-moment dyadic interactions applying sequential process analysis. These five hypothesis-testing studies showed that the quality of the coach-client relationship is influenced by interactional processes between coach and client. Therefore, they provide a useful indication that there is need for a deeper understanding and definition of coaching as a change process. All the more, as a most recent meta-analytic study (Graßmann, Schölmerich, & Schermuly, 2020) revealed that the quality of the coach-client relationship may be viewed as an interpersonal phenomenon. This perspective suggests that we need to investigate the quality of the coach-client relationship as a process variable rather than as a linear input-output variable to predict outcomes in coaching.

On the other hand, most descriptive studies in coaching process research have investigated the following factors: speech acts (e.g., Geißler, 2009) with the role of an 'active client' (p. 117) being found to be important for coaching effectiveness; critical moments (de Haan, 2008a, 2008b; Day et al., 2008; de Haan et al., 2010, de Haan & Nieß, 2012; de Haan & Nieß, 2015) looking into tension, doubt and rupture in the coach-client relationship arguing that these represent "turning points" in the coaching work (Day et al., 2008, p. 207); coach's and client's engagement level by applying the Q-methodology and analysis (Block, 2008) and using short descriptors (Q-items) of coach, client, and dyadic behavior to subjectively evaluate

participation in whole coaching sessions (e.g., Bachkirova, Sibley, & Myers, 2015); frequency of behavioral indicators in relation to coaching outcomes (Greif, Schmidt, & Thamm, 2010); coach's and client's in-session phenomenological experience (e.g., Gyllensten & Palmer, 2007) suggesting that goal-directed coaching activities are important to reach effective outcomes; client's unconscious processes as 'parallel processes' (Day, 2010; Ekstein & Wallerstein, 1958) through content analysis of client essays (Cilliers, 2005) and video analysis (Schulz, 2013) finding that the feeling of interdependency in coaching leads to psychodynamic patterns of projection and internalization between coach and client. These descriptive studies provide rich in-depth perspectives into the change process of coaching as they construct the coaching process as a series of significant individual outcomes.

These developments indicate that coaching process research has so far encountered methodological challenges for at least two main reasons. First, the definition of process research has remained fragmented (Myers, 2017). While it is easy to provide a simple definition of the coaching process, it remains evasive to define the exact parameters that constitute it (Bachkirova & Kauffman, 2009). Although current attempts to investigate coaching as a change process applying both a quantitative and qualitative design approach have produced valuable insights into the relative importance of common factors such as coach / client characteristics and the coach-client relationship, literature on coaching process research still needs to provide a holistic theory-building design (Myers, 2017). Second, both hypothesis-testing and descriptive studies share commonly reported limitations when it comes to these studies' contribution to building an understanding of the nature of coaching as a change process. These limitations include but do not exclude issues of sample-size restrictions, restricted population range, lack of objectivity due to self-reports, common methods bias, reverse causality, confounding effects such as compensatory behavior in control groups and self-selection bias with attributes.

To respond to these issues, in this thesis we were interested in addressing three commonly reported limitations, as follows: (a) sample-size restriction that impacts generalizability of findings (Ianiro, Schermuly, & Kauffeld, 2013), (b) coach/client self-reports without any complementary measures to objectify results (e.g., de Haan et al., 2013), and (c) the ethics of collecting time-series data (McDowall, Freeman, & Marshall, 2014) with client consent (i.e., video-taped coaching sessions). One good example of how to produce more objective data in process research is the study conducted by Gessnitzer and Kauffeld (2015) who applied multiple statistical measurements over time applying sophisticated sequential analysis. Thus, they answer calls from McDowall, Freeman and Marshall (2014) to collect dynamic in-session rather than retrospective data in coaching process research.

1.3 Methodological approach and process themes in this thesis

This thesis attempts to respond to these methodological issues and in conducting process research through applying both the qualitative study design to arrive at in-depth descriptions and the quantitative study design to arrive at generalizable conclusions. In doing so, we address the following four basic themes to enhance our understanding of how the overall meaning and experience of a series of sessions leads to effective outcomes for clients:

(a) *client characteristics* contextualized in the change process towards goal attainment (Figure 1.1.1) as reported in the qualitative meta-synthesis (Chapter 2);

(b) *client's self-regulation* in association with client characteristics and goal attainment (Figure 1.1.3) as reported in the study on the role of client's personality in the change process (Chapter 3);

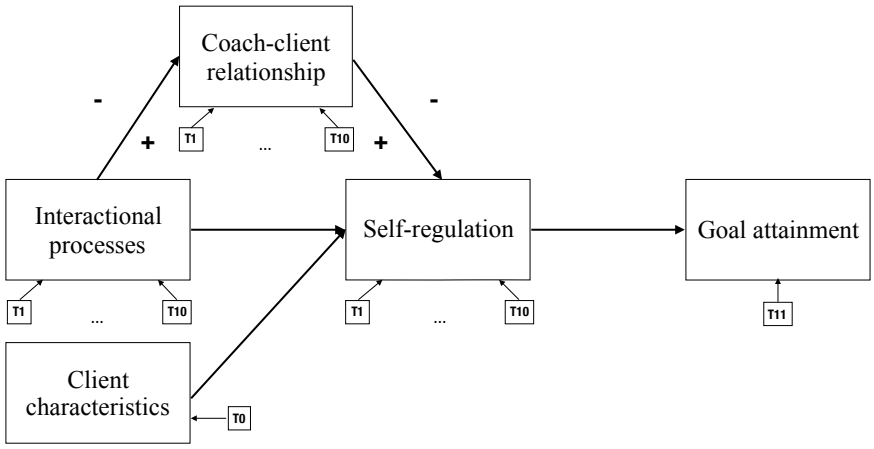
(c) *coach / client interactional processes* in association with client's self-regulation and the role of the coach-client relationship in coach / client interactional processes towards

goal attainment (Figure 1.1.4) as reported in the study on the role of movement synchrony in the change process (Chapter 4); and

(d) *development* of coach / client interactional processes over time reported in the exploratory study on the dynamics of coach-client trajectories in the change process (Chapter 5).

Figure 1.1 scopes the four basic themes while the themes are outlined separately in greater detail below.

Figure 1.1.
Overview of basic prediction model



Note. Basic prediction model indicating client characteristics in association with self-regulation; Self-regulation in association with coach / client interactional processes and goal attainment; coach-client relationship as a process variable. T1 indicates first measurement point, T10 indicates the last measurement point. T0 indicates the pre-coaching assessment of client characteristics, while T11 indicates that post-coaching assessment of goal attainment measures three months after completion of coaching

1.3.1 Client characteristics contextualized in the change process

The first aim of this thesis is to gain a comprehensive understanding of how client characteristics influence client's learning process in coaching and how the coach as client's immediate context plays out in the coaching process when it comes to client's learning. Indeed, one hot topic in coaching revolves around the role and contribution of the client (Passmore, 2007) to coaching effectiveness. This is not surprising as like in any form of professional service, clients play a significant role in coaching effectiveness. Investigating what clients bring

into the coaching room and enquiring how client characteristics contribute to coaching outcomes has the potential to enhance our understanding how coaching works.

In the extant coaching literature, the client is conceptualized as one of the 10 key areas of the Multiple-Perspective Model of coaching research (Grant, 2017) thus forming an integral part of the coaching research agenda. This key area is defined as a set of attributes that represent how clients change over the course of coaching. Client characteristics include changes in goal orientation, resilience, personality including leadership style, readiness for coaching, and self-efficacy (Grant, Curtayne, & Burton, 2009). To date, we have growing scientific evidence that the client matters in coaching with studies forming our knowledge about the contribution that clients make to coaching effectiveness. Thus far, coaching research has mainly explored client's personality (e.g., Jones et al., 2014; McCormick & Burch, 2008), change readiness (e.g., MacKie, 2015); client engagement and perception of developability (e.g., Smith & Brummel, 2013); commitment (Gan & Chong, 2013); motivation (Sonesh et al., 2015); client's motivation to transfer and client's perception of supervisor support (Baron & Morin, 2009).

While the client or client's goal-striving process is not identified as the central common factor in the Multiple-Perspective Model of coaching research, these factors are clearly embedded in contextual factors such as the client's personal system including family and work colleagues; the coach-client relationship; coach's characteristics; coach's immediate personal system including the coach's goals; client's proximal and distal systemic impact such as sponsors of coaching, organizational stakeholders; and quite generally client's broader environment as impacting client's learning in coaching. Yet, viewing the client as central to coaching effectiveness is important, all the more as various studies have contributed to the realization that there is no distinct coaching technique that makes a significant difference in the effectiveness of coaching (e.g., Jones et al., 2015). To date, client's self-efficacy (Baron & Morin, 2009; Boyce et al., 2010; de Haan & Duckworth, 2012; de Haan, 2019; Stewart et al., 2008) has been revealed as the most influential ingredient that contributes to positive coaching

results. Specifically, one study (Grant, 2014b) found that coaching improves client's self-regulation in general. Subsequently, Grant (2017) urged researchers to look into client characteristics as key to forming coaching-related models of self-regulation. Some coaching scholars go one step further calling research to investigate and conceptualize both client's intra-personal processes and inter-personal interactions in the coaching process (O'Broin & Palmer, 2010; Palmer & McDowall, 2010) to this end. This integral approach corroborates the purpose of this thesis, which is to identify how client's characteristics are embedded in client's context. The goal is to better understand how to facilitate the process of change and goal attainment (de Haan et al., 2016) as a key raison d'être and outcome of coaching (Gregory, Beck, & Carr, 2011; Gregory & Levy, 2015; Scriffignano, 2011).

Although the extant coaching literature has contributed to our understanding of the role and contribution of the client in coaching effectiveness, it is limited in at least 3 main aspects: first, the scope and relevance of client characteristics for a comprehensive understanding of goal-striving and goal-attainment remain selective and fragmented (Ely, et al. 2010; Greif, 2017). Second, we risk missing the interconnectivity of client characteristics potentially present in coaching as a change process. Third, we lack insight into how coaching clients towards goal attainment can be generalized from how clients grow their capacity to self-regulate to how they develop overall improved psychological functioning (Grant, 2017). This generalization effect may be important as goal intentions, goal setting and implementation intention alone do not automatically result in effective goal attainment (Theeboom et al., 2017). Some coaching scholars (e.g., Gregory et al., 2011) claim that self-regulation is a prerequisite for goal attainment and coach's role is to facilitate client's *'movement through a self-regulatory cycle'* (Grant, 2012, p. 255).

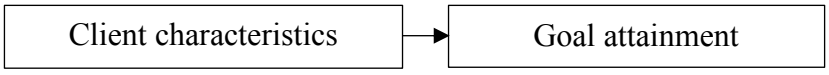


Figure 1.1.1 The client characteristic-goal-attainment perspective in coaching

Therefore, in Chapter 2 of this thesis, the aim is to address these limitations to understanding the role and contribution of the client in coaching as a change process. In doing so, we respond to scholars' calls (Grant, 2017; Greif, 2010; McDowall, 2017; Scoular & Linley, 2006) to systematically review client factors through the process-oriented lens of a qualitative review. They claim that through a pervasive identification of the multicity of influencing factors ranging from client's emotions, attitudes and behaviors to contextual conditions that affect the coaching process (Figure 1.1.2), we may better conceptualize the nuanced dynamics of client factors as revealed in their interconnectivity and as they emerge in client's change process towards self-regulation capacities, which is necessary before a full cognition of the coaching process can be claimed. For instance, there is support for the process-analytic lens in personality process theory (Hampson, 2012), which specifically maps client attributes as unique nuanced dynamic associations, which is key to our understanding how coaching as a change process works. Thus, Hampson's theory lends itself to particularly addressing the question why and how client's characteristics predict goal-attainment in coaching as a "process of personal and social meaning making" (Stelter, 2014, p. 191).

Figure 1.1.2. Basic process model of the client characteristic-self-regulation perspective in goal attainment

Conclusively, Chapter 2 employs a qualitative review design to provide a comprehensive explanation why clients behave the way they do and eventually how coaching works and why it is effective. This is useful for scholars and practitioners wishing to develop their understanding of the evidence for the effectiveness of coaching as a change process both in

coaching psychology and management development in a systematic manner (Elliott, 2010a) beyond the impact of selective variables in input-output approaches (Myers, 2017).

1.3.2 Client's self-regulation in the change process

The second aim of this thesis is to gain a comprehensive understanding of how to effectively enhance the process of self-regulation in client's goal attainment. Client's self-regulation is understood to comprise both affective and cognitive aspects of self-regulation, which psychological literature on mindfulness (Bishop et al., 2004) comprehensively defines as 1) the ability to regulate attention, 2) the orientation to immediate emotional experience, 3) the recognition of mental processes in the present moment, and 4) an attitude characterized by curiosity, openness and acceptance. These aspects form the key components of self-regulation in social psychology (Hayes & Feldman, 2004). As the role of the coach is argued to facilitate client's *'movement through a self-regulatory cycle'* (Grant, 2003, p. 255), we were interested in advancing our understanding of the role that the coach-client relationship plays in how clients self-regulate through specific interactional processes to attain goals over the course of the coaching engagement. We conducted a comprehensive quantitative study that investigated client's self-regulation by adopting two different conceptual approaches to exploring the change process in coaching: a) how client characteristics comprising affective, cognitive, behavioral and motivational dimensions of personality relate to client's authentic self-development, and b) how movement synchrony as coach / client interactional processes influenced by the coach-client relationship relates to client's goal-directed behavior beyond coaching.

As these two parallel investigative approaches form part of one large-scale coaching research working with the same dataset, we provide a uniqueness analysis (Table 1.1) to depict the manner in which the same dataset was treated differently to maximize data without data slicing (Kirkman & Chen, 2011).

Table 1.1.
Uniqueness Analyiss after Kirkman & Chen (2011) for publication of two research articles from the same dataset

Identifier	Chapter 3, in review with Consulting Psychology Journal: Research and Practice	Chapter 4, in final review with Frontiers in Psychology
Reserach question	How do the ABCDs of client's Big Five personality traits impact clients' authentic self-development as explained by affect balance?	What is the impact of nonverbal synchrony on client's emotions and cognitive self-regulation capacities? What is the impact of client's self-regulation (as operationalized through affect balance and result-oriented problem and self-reflection) on client's goal-directed behavior? How does working alliance moderate the direct effects of nonverbal synchrony on client's self-regulation?
Theoretical framework	Integrative approach to personality theory, cybernetic control theories of self-regulation	Interpersonal theories, in particular, interpersonal movement coordination, embodied cognition, ecological psychology, phenomenonological philosophy of interactional processes
Constructs / Variables	Goal construct defined as client's ultimate authentic self-development; construct of self-regulation based on Self-Regulation Model (SRRM) of affect balance; construct of personality explored on the basis of the ABCDs of the Big Five personality traits; coaching engagement defined as a phenomenonological and meaning-making change process; affect balance operationalized as a mediator	Goal construct defined as client's engagement in sustained goal-directed behavior. Construct of self-regulation defined as a meta-cognitive perspective comprising emotional and cognitive capacities to regulate emotion, attention and reflective perspective taking, working alliance as a moderator and emotional/cognitive self-regulation as a mediator; coaching engagement explored as a sysematic change process as a set of specific interactional processes through which effective change can be attained within and across coaching sessions including the development of the relationship
Theoretical implications	Affect balance plays a part in client's growth in concordance with their true self, specifically by mediating the relations between personality and authentic self-development (particularly, perceived competence and goal commitment) over the course of coaching; this study provides a method for studying client's internal processes to understand not only which personality factors contribute to coaching effectiveness but also howo personality works in coaching; progressing the way in which we describe coaching processes promises opportunities to effect change processes through our deepened understanding of personality change	Movement synchrony plays a differential role in coaching and serves as a correctional mechanism as working alliance strengthens or weakens the relevance of movement synchrony in the change process; working alliance is an interpersonal phenomenon rather than an outcome variable; movement synchrony warrants further exploration in coaching as it interacts with other variables in the change process (e.g., emotions); cognitive self-regulation has a direct effect on goal-directed behavior and goal stability is not fond to be relevant in coaching; affect blaance mderates the relationship between movement synchrony and cogntive self-regulation
Practical implications	Client's personality may help or hinder clients in attaining authentic self-development. Exploring client's affect balance as underlying internal self-regulatory processes that links their personality characteristics and authentic self-development is important for determining why same clients have difficulty engaging in authentic self-development in their goal pursuits while others are more successful in reaching and maintaining their authentic self-development	Training coaching and practicing how to strengthen client's self-regulatory capacities through working with emotions, in particular, working with moods; focusing on honing coaches' capacity to identify the quality of the coach-client relationship effectively at the outset of the coaching engagement to flexibly and spontaneously use moement synchrony towards clients' effectiveness in coaching; being and staying spontaneous and flexible throughout coaching as it is not worthwhile starting to synchronize in a linear manner: other factors (i.e., task setting, bonding, affect balance) appear to be more important

1.3.2.1 Client characteristics and self-regulation

First, since the systematic review of the extant qualitative literature on client characteristics suggested that client's behavioral, cognitive, and emotional processes are dynamically interrelated, we were interested in exploring how client characteristics comprising affective, cognitive, behavioral and motivational dimensions impacted client's effectiveness through coaching. Specifically, we looked into how the four dimensions of affect, behavior, cognition, and desire (ABCDs, Revelle, 2007; Wilt & Revelle, 2009, 2015) of the Big Five personality traits (John & Srivastava, 1999) influenced how clients engage in authentic self-development

over time (see Chapter 3 for a detailed definition) as mediated by client's emotional self-regulatory capacities (Figure 1.1.3).

In this approach, client effectiveness was explicitly conceptualized as authentic self-development (Sheldon & Kasser, 1998), that is the client's striving to achieve purposeful positive change, which enhances client's workplace performance and professional working life. This conceptualization falls in line with scholarly claims (Grant, 2012) that coaching is ultimately linked to authentic self-development as the "over-arching goal of the coaching enterprise" (Grant, 2012, p. 161) in that clients feeling competent to cope with the world as a generalized effect of self-regulation gained through coaching. It is expressive of client's actualized 'personal well-being and sense of self' (Grant, 2012, p. 146). Conceptually, authentic self-development is mostly attributed to client's intrinsic goal-orientation and self-concordance in coaching (Grant, 2012; Spence & Oades, 2011). Intrinsic goal-orientation and self-concordance relate to the three basic human needs of autonomy, competence and relatedness as expressed forms of self-determination (Deci & Ryan, 1985). They refer to the degree to which a goal is aligned with individuals' intrinsic interests, needs, values and motivations (Sheldon & Elliot, 1998; Sheldon, Prentice, Halusic, & Schüler, 2015). Despite the recent surge in literature on authenticity (Sutton, 2020), the mechanism by which clients attain authentic self-development has remained a black box in coaching. Therefore, this particular conceptual approach of the comprehensive study focused on how client's sense of authentic self develops through coaching over time.

Furthermore, the Self-Regulation-Model (SRRM) by Sirois (2015a, 2015b) was found to be the adequate conceptual framework for mapping how client's emotional self-regulation played out in the association between personality and authentic self-development. Building on cybernetic control theories of self-regulation (Carver & Scheier, 2009) and strength models of self-regulation (Baumeister, Vohs, & Funder, 2007), the SRRM was originally developed and tested to explain the links between personality and health behaviors (Sirois, 2015a, 2015b). The

SRRM model integrates the relative balance between positive and negative affect (Watson, Clark, & Tellegen, 1988).

Figure 1.1.3.
Basic process model - Prediction 1

Note. Basic process model, in which ABCDs of Big5 represents the affective (A), behavior (B), cognition (C), and desire (D) dimensions of the Big Five personality traits; Self-Regulation as measured through affect balance; Self-Regulation mediates Authentic Self-Development

1.3.2.2 Coach / client interactional processes and self-regulation

Second, in pursuit of the suggestions derived from the systematic literature review that the coach as the client's immediate context potentially influences client's intrapersonal processes we subsequently investigated coach/client interactional processes. The aim was to look into how coach/client interactional processes impact on client's self-regulatory capacities in the process of client's goal-directed behavior beyond coaching. We can find considerable support for studying interactional processes in the theoretical framework of interpersonal movement coordination (IMC, Bernieri & Rosenthal, 1991) positing that the degree to which two individuals simultaneously respond to each other dynamically through movement will influence the quality of their interactions. IMC implies that interactants do not act independently from each other and that body movement as the physical manifestation of dynamic interactions between interactants will have an impact on their cognitive and emotional states. This interactive effect reflects the dynamical systems view that action (i.e. nonverbal response) is followed by embodied perception (i.e., sensing through the body) of external stimuli (i.e., interactant's behavior) and subsequent emotional and cognitive processing of those stimuli (i.e.,

making meaning) as conceptualized in ecological psychology (Gibson, 1966) and in phenomenological philosophy (Merleau-Ponty, 2002). In simple terms: movement provides information that includes signals that will be used by interaction partners to navigate a social environment (Coey, Varlet, & Richardson, 2012). We based our investigation on the argument that the nonverbal perception-action cycle as expressive of body-movement synchrony is directly linked to how clients feel capacitated to self-regulate in sessions toward goal attainment.

In assessing the level of goal attainment three months after completion of coaching, this investigative approach conceptualized goal attainment as client's sustained goal-directed behavior through coaching (Gregory et al., 2011). This approach operationalized five cognitive ingredients (Prywes, 2012; see Chapter 4 for a detailed description) of goal attainment (i.e., goal-oriented planning, perceived goal-competence, goal self-concordance, goal stability, and conscientiousness) as direct effects of sustained goal-directed behavior and one emotional ingredient (i.e., goal commitment). In clients where these cognitive ingredients of goal attainment are maintained after coaching, we understand the coaching engagement to have been effective and sustainable. This conceptualization chimes in with coaching findings that the highest quality form of goal attainment is attained when client's 'need to be autonomous' is met (Schiemann, Mühlberger, & Jonas, 2018a), when they attain goals through engagement in sustained goal-directed behavior beyond coaching (Bachkirova & Lawton Smith, 2015).

For the purposes of this investigative approach, self-regulation was conceptualized as a meta-cognitive monitoring ability (Greif & Berg, 2011) that focuses on result-oriented self-reflection and comprises emotion regulation (Feldman, 2015; Hayes & Feldman, 2004). As such, self-regulation was measured both as client's cognitive capacity to regulate attention and reflect problems in a result-oriented manner (Greif & Berg, 2011) and as client's affective capacity to orientate to immediate emotional experience and establish affect balance (Watson, Clark & Tellegen, 1988).

1.3.2.3 The role of the coach-client relationship in coach/client interactional processes

Studying the coach-client relationship as a common factor appears to gain traction. Since it emerged as a new direction in coaching research (McKenna & Davis, 2009) and first studies (Scoular & Linley, 2006; Stewart et al., 2008; Baron & Morin, 2009) started exploring the coach-client relationship in terms of similarities and dissimilarities between coach and client, studies have produced a whole range of different and even contradictory findings (Grant, 2017), which renders the practical implications of findings unclear. Most recently, coaching studies have produced some contradictory findings relating specifically to the quality of the coach-client relationship.

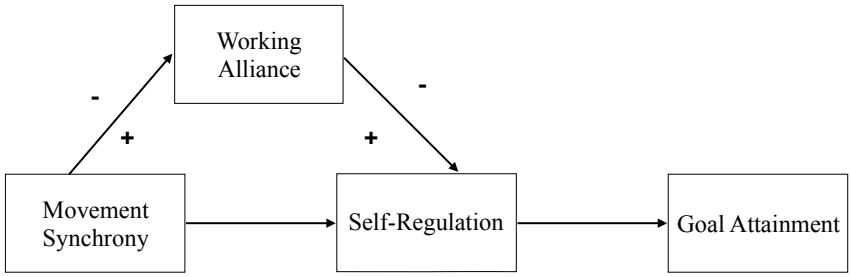
To date, echoing much research in psychotherapy literature (Lambert & Barley, 2001), coaching research has widely recurred to the concept of working alliance (Bordin, 1979) to determine the quality of the coach-client relationship as a key ingredient of coaching effectiveness (Baron & Morin, 2009, 2012; Boyce et al., 2010; de Haan, Culpin, & Curd, 2011; de Haan et al., 2013; de Haan, Gray, & Bonneywell, 2019; Grant, 2014a; Molyn et al., 2019). While some studies showed that working alliance is the most single important contributor to coaching effectiveness (e.g., de Haan et al., 2013; de Haan et al., 2019), a most recent study exploring the nature of working alliance between coach and client revealed that it is not strongly related to coaching effectiveness (Molyn et al., 2019). In that study, it appeared that the strength of the working alliance only correlated with a higher effectiveness score when associating the beginning and the end of the coaching relationship. However, it did not significantly correlate with increasing outcomes through continued coaching conversations. Molyn et al's (2019) outcome research reinforced the debate around the extent to which working alliance is attributable to how coaching as a process produces change in and for clients (Haan, 2008). All the more as an earlier study (de Haan et al., 2016) revealed that the quality of the coach-client relationship has more of a moderator role in how it influences the impact of client's self-

efficacy, resilience, and some 'bright side' aspects of personality on coaching effectiveness. Yet another study (Grant, 2014a) showed that focusing on goals as the coach's ability to hold the client's attention on outcomes appears to be more relevant for effectiveness in coaching than bonding and trust (Boyce et al., 2010; de Haan, 2008a; de Haan & Nieß, 2012; O'Broin & Palmer, 2010) as the other key components of working alliance.

Specifically, for the purposes of this thesis, we can find specific evidence for the relevance of the coach-client relationship in sports coaching (Jowett, 2017) where the interplay between the coach-athlete relationship and self-regulation has been sufficiently corroborated (Collins, Willmott, & Collins, 2018). Other coaching studies (O'Broin & Palmer, 2010) indicate that the coach-client relationship as an interpersonal phenomenon is a unique common feature of all relationships in helping interventions (e.g., counselling, psychotherapy, mentoring). This conceptualization finds support in Cavanagh and Grant's (2006) scholarly view and is corroborated through findings that the coach-client relationship is a key factor in all types of coaching interventions despite the different nature of the coach-client relationships in these coaching interventions (Bachkirova, Sibley, & Myers, 2015).

In this thesis we were interested in exploring the role of working alliance as an interpersonal phenomenon much in the same way as movement synchrony in coaching as a change process. Specifically, it focused on looking into the extent to which working alliance strengthens or weakens the relationship between movement synchrony and client's self-regulation (Figure 1.1.4). In doing so, we adopted the theoretical framework that the coach-client relationship is a "complex adaptive system" (O'Broin & Palmer, 2010, p. 28). Our approach chimes in with findings of a most recent meta-analysis on the relationship between working alliance and client outcomes in coaching (Graßmann et al., 2020). This meta-analysis indicates that working alliance accelerates or decelerates but does not cause coaching outcomes.

Figure 1.1.4.
Basic process model - Prediction 2



Note. Basic process model, in which Movement Synchrony represents nonverbal body responses in dyads as measured with MEA (Motion Energy Analysis); Self-regulation as measured through affect balance and result-oriented problem and self-reflection; working alliance as the quality of the coach-client relationship is measured via WAI (Working Alliance Inventory) and moderates the association between Movement Synchrony and Self-Regulation. Goal attainment is measured via components of goal-oriented behavior.

1.3.2.4 Development of coach / client interactional processes over time

Finally, Chapter 5 looks into the change process by further exploring the development of coach / client interactional processes. Specifically, this exploratory approach aimed to enhance our understanding of how movement synchrony evolves from session to session per dyadic interaction and to what extent time as expressive of number of sessions factors in when it comes to coaching effectiveness. This last exploratory approach was designed to complement our understanding of the potential relevance of temporal aspects of movement synchrony. There is support for this exploratory approach as a meta-analysis (Theeboom, Beersma, & Van Vianen, 2014) following calls by Smither (2011) examined the effects of the number of coaching sessions on the overall longevity of coaching interventions and found that a greater number of coaching sessions did not relate to higher effectiveness of coaching. Another coaching study (Baron & Morin, 2010) revealed that the number of coaching sessions had a positive and significant relationship with client's self-efficacy. Yet another study (Sonesh et al., 2015a) showed that the number of sessions held was associated with goal attainment indicating that engaging in 1 – 3 sessions was better than 4 – 6 but not as effective as engaging in 7 – 9 sessions. Therefore, conducting a more in-depth analysis into the temporal aspect of movement

synchrony appeared meaningful to complement our understanding of how coaching works as a "complex adaptive system" (O'Broin & Palmer, 2010, p. 28). Moreover, the exploratory approach in Chapter 5 included digging deeper in the black box of within coach-client dyads.

1.3.3 Research questions and structure of the thesis

In summary, to achieve the aims discussed above, the thesis comprised the following two research questions:

> Q1: Which client factors and contextual factors reported in primary qualitative studies are relevant for coaching effectiveness?
>
> Q2: How do primary qualitative studies suggest that these factors interrelate in client's learning as a context-sensitive and dynamic change process?

To achieve the second aim of gaining deeper understanding of how client characteristics as a dynamic intrapersonal factor influence client's authentic self-development as explained by client's self-regulation, we sought to answer the following research question:

> Q3: How do the ABCDs of client's Big Five personality traits impact client's authentic self-development as explained by affect balance?

To achieve the third aim of gaining deeper understanding of how coach / client nonverbal interaction dynamics as an interpersonal factor influence client's self-regulatory capacities in the coach-client relationship towards goal attainment, we sought to answer five research questions, as follows:

Q4: What is the impact of nonverbal synchrony (spontaneous movement coordination) on client's self-regulation capacities as operationalized through self-reported affect balance?

Q5: What is the impact of nonverbal synchrony (spontaneous movement coordination) on client's self-regulation capacities as operationalized through result-oriented problem and self-reflection?

Q6: What is the impact of self-regulation on client's goal-directed behavior in coaching as operationalized through affect balance?

Q7: What is the impact of self-regulation on client's goal-directed behavior in coaching as operationalized through result-oriented problem and self-reflection?

Q8: How does working alliance moderate the direct effects of nonverbal synchrony on client's self-regulation (operationalized through result-oriented problem and self-reflection as well as positive and negative affect) in coaching?

To achieve the fourth aim of gaining deeper understanding of how nonverbal synchrony as expressive of spontaneous movement coordination, we sought to answer the following research question:

Q9: How does nonverbal synchrony (spontaneous movement coordination) develop over time per session and dyadic interaction?

As the thesis comprises three main peer-reviewed journal articles (Chapter 3 and Chapter 4 in final review), each of the following three chapters treats research questions based on a peer-reviewed journal publication elaborating answers to these questions in that same chapter, respectively. Chapter 5 elaborates Q9 providing answers to it without this chapter relating to a peer-reviewed journal publication. Chapter 6 as the final chapter of the thesis discusses the

main findings in their integrity drawing final conclusions and proposing some implications of the findings in their integrity for future coaching research and practice. Table 1.2 provides an overview of the distribution of research questions per journal articles / chapter in this thesis, the scope of presentation at conferences, and the current submission state.

Table 1.2. Academic journal publication status

Research question	Thesis chapter	Academic journal	Authorship	Conference
Q1: Which client factors and contextual factors reported in primary qualitative studies are relevant for coaching effectiveness?	2	Coaching: An International Journal of Theory, Research and Practice, *published*	Tünde Erdös, Erik de Haan. Stefan Heusinkveld	EMCC: 7th International Mentoring and Coaching Research Conference , Greenwich 2017
Q2: How do primary qualitative studies suggest that these factors interrelate in clients' learning as a context-sensitive and dynamic change process?	2			
Q3: How do the ABCDs of clients' Big Five personality traits impact client's authentic self-development as explained by affect balance?	3	Consulting Psychology Journal: Practice and Research, *in interactive revision*	Tünde Erdös. Michael Tichelmann, Joshua Wilt	EMCC: 27th International Mentoring, Coaching and Supervision Conference, Prague, 2021
Q4: What is the impact of nonverbal synchrony (spontaneous movement coordination) on client's self-regulation capacities as operationalized through self-reported affect balance?	4	Frontiers in Psychology, *final revision*	Tünde Erdös, Fabian Ramseyer	11th Institute of Coaching Conference, McLean Hospital, A Harvard Medical School Affiliate, Boston, US, 2018; visit www.ptc-coaching.com for all the conferences and presentations between 2017 and 2020
Q5: What is the impact of nonverbal synchrony (spontaneous movement coordination) on client's self-regulation capacities as operationalized through result-oriented problem and self-reflection?	4			
Q6: What is the impact of self-regulation on client's goal-directed behavior in coaching as operationalized through affect balance?	4			
Q7: What is the impact of self-regulation on client's goal-directed behavior in coaching as operationalized through result-oriented problem and self-reflection?	4			
Q8: How does working alliance moderate the direct effects of nonverbal synchrony on client's self-regulation (operationalized through result-oriented problem and self-reflection as well as positive and negative affect) in coaching?	4			
Q9: How does nonverbal synchrony (spontaneous movement coordination) develop over time per session and dyadic interaction?	5			

Chapter 2. Coaching: client factors & contextual dynamics in the change process - A qualitative meta-synthesis

2.1 Introduction

2.1.1 Mapping out the territory

There is a recent shift from *how to coach* to *what impacts client's learning* (e.g., Jones et al., 2016) in coaching as a context-sensitive change process (e.g., Athanasopoulou & Dopson, 2018). There is a major theoretical consideration. The context-sensitive process approach implies that coaching is more than a mere coach-client learning-based intervention. Cox et al. (2014) view coaching as subject to fluctuations of the properties of the coach, the client, the coach-client relationship and various contextual factors and claim that it is more than an input-output cause-effect activity. As such, the context-sensitive process approach is an alternative perspective to the more widely held cause-effect explanations (Cavanagh, 2013) on coaching practice. Against this conceptual framework, we place coaching as a purposeful meaning-making process (Drake, 2015) in a context that may explain emergent client characteristics making this interactive learning system dynamic without any links to specific methodical approaches (Bachkirova & Lawton Smith, 2015). In doing so, we investigate client factors and contextual dynamics in coaching as a context-sensitive change process. The aim is to complete our understanding of which client factors impact client's learning and how contextual dynamics play out in client's change process as reported in the articles reviewed in this qualitative meta-synthesis.

2.1.2 Reviewing earlier literature

One persistent debate in relation to the contextual character of coaching revolves around the interrelatedness of client factors as they contribute to coaching outcomes (Passmore, 2007) both

in client's proximal (de Haan & Nieß, 2015) and distal context (Terblanche, 2014). Investigating this interrelatedness potentially enhances our understanding of how coaching works (e.g., Bozer & Jones, 2018) as a dynamic set of intrapersonal and interpersonal interactions (e.g., Palmer & McDowall, 2010). Our aim is to complete our insight into how to facilitate client's change process and goal attainment in the future. We wish to inspire future qualitative and quantitative research into coaching as a context-sensitive change process.

Thus far, coaching research reveals that client's responses such as trust (e.g., Gyllenstein & Palmer, 2007) commitment (e.g., Gregory, Levy, & Jeffers, 2008) and self-efficacy (e.g., de Haan & Duckworth, 2012) are the most influential 'active ingredients' (McKenna & Davis, 2009) for positive coaching results. However, the majority of primary studies examining the role and contribution of the client in coaching effectiveness have drawn primarily on quantitative approaches. As such, they are focused on hypothesis-testing and cause-effect relationships with studies relating to only a few client factors as isolated active ingredients (e.g., self-efficacy). They do not account for coaching as a change process. This is unfortunate as we might miss the prevalence of relevant client factors that potentially impact client's learning. At the same time, we might also miss the manner in which client factors interrelate with client's proximal and distal contexts as dynamic change process.

2.1.3 Adopting a purely interpretative approach

Generally, our coaching practice grows continuously and we still have only limited scientific evidence about the most effective coaching interventions. We need more inspiration from research to think about how coaches can be more effective. Specifically, we need a bridge between qualitative research and coaching practice as we understand it through quantitative research by making qualitative research more accessible to practitioners. Practitioners need guidance in working with clients as they have many choices to make. They need a richer evidence base to be credible towards clients. Reviewing purely qualitative primary research to

explore the interrelatedness of client factors and contextual factors may help as findings can deepen our understanding of coaching, particularly when we view coaching as a context-sensitive and dynamic change process.

Quantitative research has contributed to our understanding of client's role in coaching effectiveness. Yet, findings are limited in one main aspect: the need to isolate general client factors in quantitative research inevitably leads to fragmented findings (Ely et al., 2010). Isolating factors misses the potential interrelatedness of client factors and contextual factors present in client's goal-attainment. We risk missing the relevance of such interrelatedness for coaching as a context-sensitive and dynamic change process. This limitation has left coaching outcome research open to accusations of theoretical imprecision given the under-regulated and varied nature of the practice (Western, 2012). As a result, some scholars (e.g., de Haan, 2019) emphasize the significance of reviewing client factors through a process-oriented lens of qualitative studies to identify patterned shifts for clients. They argue that such an approach could overcome this limitation by sensitizing researchers and practitioners to how the multicity of client factors plays out in coaching as intrapersonal outputs (e.g., Ianiro & Kauffeld, 2014) shaped by contextual influences across sessions and over time. Moreover, some scholars (e.g., Day, 2010) recognize that gaining a deeper understanding of the patterned dynamics of client's internal world as revealed in their interrelatedness and as they emerge in client's social contexts is necessary before we can claim to fully understand coaching. In providing insight into how these factors interrelate, qualitative literature is believed to "yield truths that are better, more socially relevant, or complete" (Paterson et al., 2001, p. 111). Hence, it enhances our theoretical understanding of the multicity of factors involved in coaching engagements (Bachkirova, 2017) or guides coach's actions (e.g., Drake, 2015).

Despite scholarly calls (e.g., Myers, 2017) for coaching process researchers to systematically review primary qualitative studies as the new conceptual route, the conceptualization of client's goal attainment has remained limited to systematic reviews

focusing exclusively on either quantitative studies (e.g., Jones et al., 2016; Sonesh et al., 2015; Theeboom et al., 2014) or mixed-method approaches (e.g., Athanasopoulou & Dopson, 2018; Bozer & Jones, 2018) or specific types of coaching (e.g., Lawrence, 2017). These reviews do not explain the dynamic interrelatedness of the client factors or contextual factors that were found to determine coaching effectiveness.

2.1.4 Systematic questions

Most recently, de Haan's (2019) first systematic review of 101 qualitative publications in workplace and executive coaching highlighted the coach-client related success criteria (i.e., development of trust in, acceptance of and commitment to coaching, capacity to agree on tasks and goals, the client's adherence to the coaching contract, a shared psychological understanding and newly gained insight). De Haan's (2019) systematic qualitative review sets the stage for our research questions:

> Q1: which client factors and contextual factors reported in primary qualitative studies are relevant for coaching effectiveness, and
> Q2: how do primary qualitative studies suggest that these factors interrelate in client's learning as a context-sensitive and dynamic change process.

Based on these questions, the purpose of this purely qualitative meta-synthesis is to explore coaching as a context-sensitive and dynamic change process as patterned interactions of client factors and contextual factors imply consequences for how we can deepen our understanding of coaching.

2.1.5 Contribution of this paper

The contribution of this qualitative meta-synthesis is two-fold. First, we provide a pervasive picture of client factors aggregated as *emotion, attitude* and *behavior*. Through interpretive synthesis as a patterned meaning-making approach, we provide more manageable means of analysis for researching how client factors might interrelate in client's change process. The aim is to deepen our understanding of the dynamic nature of coaching. We emphasize the significance of emotion as an under-researched and under-theorized factor in explaining why clients do what they do in coaching. This emphasis gives researchers future directions in how to investigate coaching effectiveness. Second, in applying a process-oriented lens, we develop an Integrative Relationship Model (IRM) to depict the patterned interrelatedness of the client factors and contextual factors that are proposed to affect when and how clients might engage in coaching as a context-sensitive process. It is this context-sensitive approach to change processes that we elucidate for a deeper understanding of client's intrapersonal and interpersonal dynamics as a linchpin of their learning. This is useful to conduct future quantitative investigations of how to facilitate change towards effective goal-attainment in coaching psychology and management development beyond the impact of selective variables (Myers, 2017).

2.2 Methods

Qualitative meta-synthesis (Sandelowski & Barroso, 2007) was selected as an acknowledged methodology in social sciences (Siddaway et al., 2018) and management (Denyer & Tranfield, 2006; Tranfield et al., 2003) to inductively conceptualize client factors and contextual factors and to answer Q1 and Q2. Induction lends itself to explaining some lawful relationships between social experiences (Gephart, 2004) through interpretation. The reason is that interpretation is grounded in knowledge deriving from social facts that are embedded in social

actions (Miles & Huberman, 1994). Therefore, qualitative meta-synthesis was identified as a best-fit process framework for a.) identifying, b.) analyzing, and c.) interpreting results across multiple study types (Chenail et al., 2012). It is a valuable tool for exploring the (a) depth (given the qualitative approach) and (b) breadth (given the integration of primary studies from various coaching contexts and participant groups) of client factors and contextual factors in primary qualitative studies. Its integrative nature involves going beyond the findings of any primary study to assimilate the "whole into something more than the parts alone imply" (Noblit & Hare, 1988, p. 28).

In elucidating research gaps, related fields like psychotherapy (Lachal et al., 2017) systematically recur to qualitative meta-syntheses to inform the development of quantitative research. Our purpose is to advance our knowledge of how to design, implement and evaluate coaching interventions as this has been achieved successfully in the field of health interventions (Tong et al., 2012). The explicit review methods (Chenail et al., 2012) ensure credibility, dependability, transferability, and confirmability as necessary and sufficient conditions of providing trustworthy, structured, transparent, auditable and substantiated results while allowing for fluid and flexible interpretive processes.

Although our approach harbors some challenges (e.g., inability to account for philosophical assumptions, use of English-only search terms) as discussed by Pittaway et al. (2004) it appears adequate for providing a thorough, explicit and unbiased evaluation of the contribution of a specific body of literature (Denyer & Neely, 2004). Table 2.1[1] provides a comprehensive protocol following the seven aspects of qualitative meta-syntheses (Sandelowski & Barroso, 2007) and is guided by reporting standards as discussed by Tong et al. (2012) and Hoon (2013).

[1] Appendix Table 2.1. Qualitative Meta-Synthesis Process Overview

2.2.1 Systematic literature search

Conducting a systematic literature search proved difficult for two reasons. First, we lack established methods for locating qualitative research (Tong et al., 2012). Therefore, the search strategy involved searching all the available concepts iteratively rather than studies alone until saturation was reached (Barnett-Page & Thomas, 2009). This approach required re-engaging with literature in a purposive way (Patton, 2002) and stimulated adaptations of the inclusion/exclusion criteria. Second, the indexing of qualitative research in electronic databases and search processes is not transparent (Dixon-Woods et al., 2007).

Against this background, following (1) a primary social science database search in combination with a purposively selected set of keywords, (2) a secondary search applying the snowball technique (Barroso et al., 2003) for a bibliographic scholarly literature source known to the authors, this synthesis incorporated (3) a tertiary search through forward citation on the basis of the initially sampled papers and recently published handbook chapters in the area, (4) grey literature searches beyond the control of commercial publishers to include any theoretically relevant articles for review (Siddaway et al., 2018). The entire search strategy was performed in six steps (Figure 2.1).

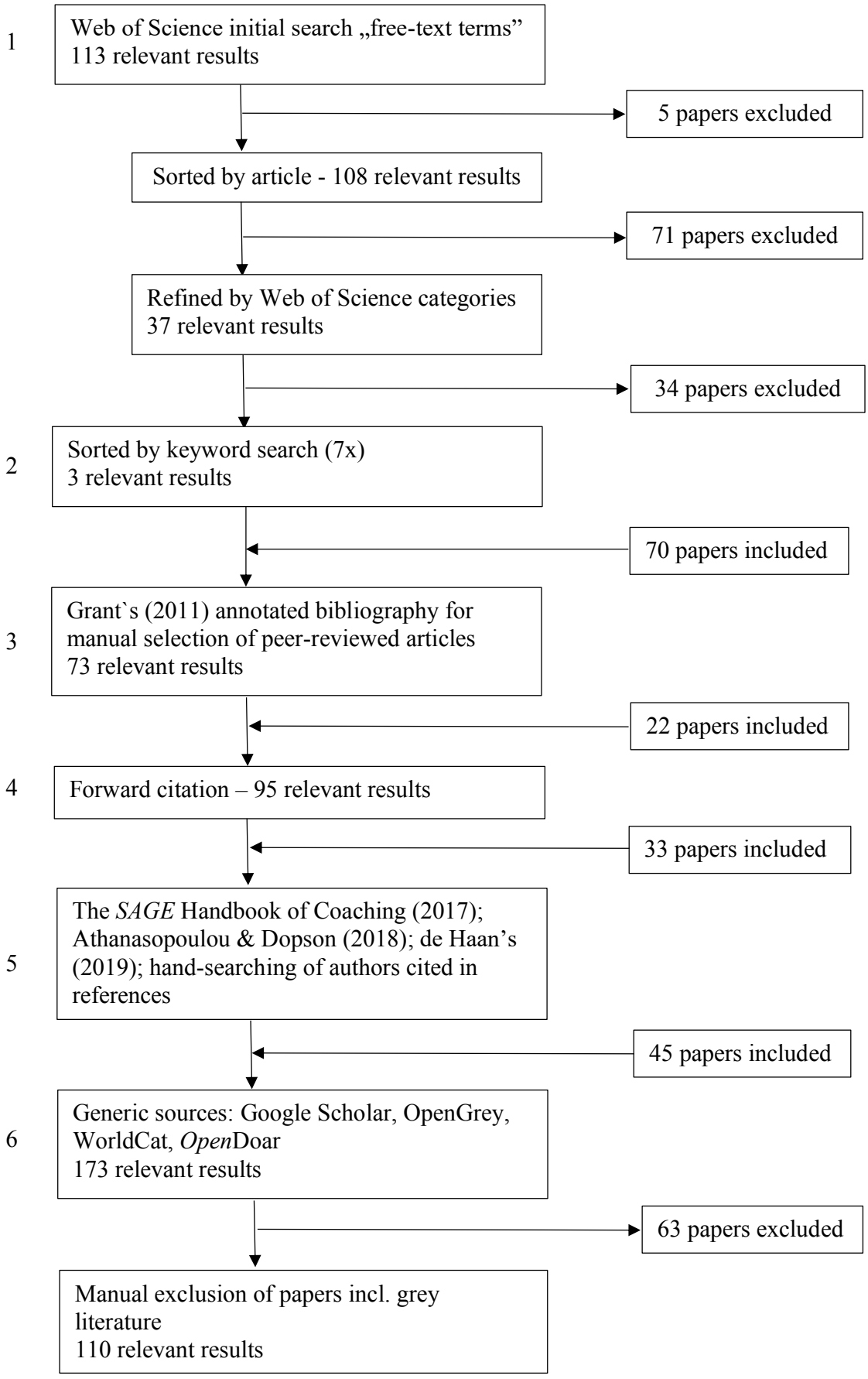


Figure 2.1. Overview of sampling process and results

First, the primary database selected for records is the ISI Web of Science as it counts among the most comprehensive interdisciplinary databases (integrating EBSCOhost, PsychInfo, ProQuestion) of high-impact peer-reviewed journals in the social sciences. We sought highest trustworthiness and dependability of findings by initiating a sensitive search strategy. Although ISI restricts its indexing coverage to high-impact journals, it was considered the best option for journal citations. The initial search based on the free-text terms 'coaching', 'coaching process', and the combination with the methodological filter 'qualitative research', but NOT 'sport', and NOT 'med*', sorted by articles and refined by Web of Science database categories and search strings yielded 113 hits. Further combinations with terms for qualitative methods and methodology proved futile as they have undergone little validation (Flemming & Briggs, 2007). Search terms were all recorded in the audit trail. Second, we added keywords to refine search results. While the client as an influencing factor has evolved into a key area of study, there is remarkably little consistency in the terminology (Greif, 2017). A range of taxonomies are used to refer to this empirical phenomenon, making it difficult to delineate the boundaries of the field of research under review. The keywords used to denote the client as an influencing factor were 'client', 'coachee', 'success factor', 'outcome criteria' and 'antecedent' as scoped by Ely et al. (2010) and Greif (2017). This addition yielded one (n=1) relevant result and was then further complemented with the labels 'active ingredients' (McKenna & Davis, 2009) and 'common factors' (de Haan, 2008) to establish further variants (n=9), as recommended in bibliographic database search (Page, 2008). This approach yielded two (n=2) relevant results. So, even though these keywords are used as labels to signify the relevance of the client in terms of coaching effectiveness, these search terms may not be appropriate to conclusively reflect the area of research under review. As primary qualitative papers on coaching are underrepresented in the high-impact journals recorded in Web of Science, the impact factor of the journals was eventually not accounted for. Instead we aimed to identify the relevance that publications have for identifying client factors and contextual factors as well as for improving our understanding

of the dynamic interrelatedness of client-specific factors that influence coaching outcomes. Third, Grant's (2011) annotated bibliography of scholarly publications served as a secondary basis for a thorough manual selection of solely peer-reviewed articles that use qualitative research methodologies. This scanning approach resulted in the identification of seventy publications (*n*=73). Fourth, this set formed the basis for a tertiary strategy of forward citation, and the purposive sampling process resulted in the identification of additional relevant papers (*n*=95) including *inter alia* doctoral dissertations, both published and unpublished, pertinent to the review question. Fifth, to avoid missing potentially relevant and most recent records the volume The Sage Handbook of Coaching (2017) edited by Tatiana Bachkirova, Gordon Spence and David Drake was screened for relevant peer-reviewed articles (until January 2017) as well as Athanasopoulou & Dopson's (2018) and de Haan's (2019) most recent systematic literature reviews of qualitative studies. These tertiary methods resulted in the hand-searching of authors cited in the reference lists of these works. Additional studies pertinent to the review questions were located (*n*=45). Sampling primary qualitative studies was carried out until the point of saturation was reached. Sixth, the systematic search also included more generic electronic sources such as Google Scholar, OpenGrey, WorldCat, and OpenDOAR. It was guided by consultations with the co-authors. Articles published after December 2019 are not included in the search hits. A total of 173 references were exported to a summary table and categorized by type of study, title, author, journal, number of participants, and research paradigm. Electronic and hard copies of publications were obtained to appraise whether (a) articles met inclusion criteria, (b) inclusion criteria required further adaptations, and to identify (c) the methodological perspectives and focus of studies (Sandelowski & Barroso, 2007).

2.2.2 Inclusion & exclusion and quality appraisal

First, an initial inclusion/exclusion question was formulated (i.e., 'What is the evidence of client's characteristics investigated?') to determine whether the 173 articles fit Q1. Second, the

Critical Appraisal Skills Programme (CASP; National CASP Collaboration, 2006) was selected as a set of criteria (10 Questions to Help you Make a Sense of Qualitative Research) along which to systematically appraise the quality of primary qualitative studies and to assess the articles collected for inclusion/exclusion. This tool aims to establish rigor, credibility and relevance of qualitative research studies. In specific, the CASP questions seek to elucidate a) the research design, b) sampling strategy, c) data collection method, d) researcher reflexivity, e) ethical considerations, f) rigor of data analysis, g) clear presentation of findings, and h) relevance and trustworthiness of research for each study. As this synthesis seeks to provide an integrative framework of the dynamic interrelatedness of client factors and contextual factors evident in the findings, the CASP questions were adapted: 'contextual emphasis' was added as a criterion to answer Q2. A three-level weighting approach (primary, secondary, tertiary) served as a means to establish the performance of the articles for each CASP category. We decided not to differentiate between the methodical approaches in the primary qualitative studies as this systematic meta-synthesis places the focus on identifying and then interpreting process-inherent patterns of interrelatedness of client factors and contextual factors rather than describing the methodical quality differences in findings presented in any specific study type. In particular, as this qualitative meta-synthesis was designed to focus on identifying client's change process in a discovery-oriented manner in primary qualitative study designs and analyses, studies that sufficiently answered the research questions were not excluded based on the research design even if they included certain secondary quantitative elements (e.g., questionnaires, descriptive statistics). For the same reason, the typical publication bias (e.g., exclusion of articles for lack of statistical significance) did not appear to apply. To establish an audit trail, exemplary quotes pertaining to the criteria were cut electronically from the articles and pasted into the appropriate row in the summary table as evidence of suitability. As a result, some articles (n=63) were excluded as the abstracts turned out to relate to topics that were not coaching-specific, or because papers did not answer the research questions or failed to describe methodical criteria

(e.g., outcome study, study review). In effect, to avoid discounting important studies for the sake of 'surface mistakes' (Sandelowski et al., 1997) it was decided to include soundly based findings even when other findings from the same study might be rejected (e.g., focus on the coaching and mentoring paradigm in the same paper; mixed method approaches and descriptive statistics). Grey literature (e.g. books, book chapters) was excluded as papers did not meet CASP criteria. It was decided to instrumentalize grey literature only for forward citation. Table 2.2[2] provides the list of the primary qualitative articles included in this meta-synthesis.

Eventually, this qualitative meta-synthesis includes only empirical work on coaching generally as published in peer-reviewed journals to attain highest quality in synthesizing primary qualitative studies. The studies included answer the research questions and reflect both coach's and client's perceptions of coaching effectiveness as a meaning-making process. Additionally, this qualitative meta-synthesis includes published and unpublished doctoral dissertations. The reason is that dissertations are rigorous peer-reviewed papers that contain rich and methodologically robust procedures and are likely to produce reliable and valid outcomes. They can be considered validated evidence and can be expected to have the highest impact in the research field under review (Podsakoff et al., 2005). Conversely, action research (e.g., Reason & Bradbury, 2001) thesis papers were found to be unsuitable for the purposes of this qualitative meta-synthesis. Although these papers are a rigorous form of self-study and offer a thorough exploration of coaching and the coaching relationship coaches focus on their learning from a perspective of first-person enquiry. Therefore, action research papers do not adequately answer the research questions in this qualitative meta-synthesis which seeks to conceptualize how clients learn in coaching. The 1990s were chosen as the starting point for inclusion because Sperry's (1993) dialectic article describing how psychologists can respond to executives' need for consulting, coaching, and counselling and Peterson's reports (1993,

[2] Appendix Table 2.2. Summary table of primary qualitative studies reviewed in the qualitative meta-synthesis

1996) on how to evaluate executive coaching engagements were the pivot points for dismantling barriers to publication of qualitative research studies. This synthesis includes English-only (American and British) articles, although the studies selected for further analysis did include empirical studies conducted in countries in which English was a secondary language. Any amendments or additions were recorded in a memo to ensure an accurate audit trail (Houghton et al., 2013).

2.2.3 Data collection and extraction

In collecting and extracting data from the final set of 110 articles, systematic rereading was identified as the appropriate process to retain the richness of the original studies and to avoid superficial reporting of the data (Sandelowski & Barroso, 2007). A simple cross-study data display was created as a system by which to extract contextual and client-factor dynamics as a basis for performing a line-by-line identification of qualitatively unique distinctions drawn by authors in the studies. The aim was twofold: (a) to allow for comparisons between the studies towards synthesizing the findings, and (b) to avoid performing the synthesis separately from the contextualization of original studies. Ultimately, the cross-data display identifies the following descriptors found in each study: (a) full citation for articles; (b) context (e.g., coaching setting and approach, client characteristics); (c) data analysis supported by direct quotes; (d) categories, (e) subcategories and themes reported (data can be obtained upon request). In this phase, the author of this qualitative meta-synthesis was tasked with the data extraction and the co-authors contributed to a percentage (i.e., 10%) to provide some quality assurance for the adequacy of data extraction. The trustworthiness and transferability of results were determined by the level of quality of reporting sought or achieved in the primary studies (e.g., consistent triangulation, saturation) as explained in data analysis and synthesis below.

2.2.4 Qualitative data analysis and synthesis

The analytical method selected for generating themes is known as thematic synthesis (Thomas & Harden, 2008). As is typical for conducting a qualitative meta-synthesis, the main author of this qualitative meta-synthesis built on her personal background and insights as an executive coach for analyzing themes. Thus, this meta-synthesis inevitably is only one possible interpretation of the data (Kinn et al., 2013). Consequently, to establish triangulation in assessing the rigor and quality of the analytical process as well as to develop a complex understanding of the data collected, two coaches were invited into the process of considering the same data set (Barry et al., 1999). Data analysis was applied in two stages to comprehensively and systematically characterize text data inductively responding to material emerging in the texts.

2.2.4.1 Data Analysis: Stage One

First, a thorough rereading to appraise, organize, relate, map and verify sets of accounts resulted in the clustering of articles by five distinct study types (interview, case study, descriptive statistics, exploratory study, interaction analysis). Clustering was the product of an ongoing dialectic process of sampling and raised the question of how to treat qualitative research in terms of methodical rigor: (a) how to deal with mixed-method approaches; (b) would content analysis qualify as a qualitative analysis strategy. It was decided that articles in which the mixed-method approach was not dominant and in which content or structural analysis was based on qualitative data collection would be included in this meta-synthesis. As this meta-synthesis focuses on synthesizing the dynamic interrelatedness of client factors and contextual factors rather than on an exhaustive summary of findings, all five primary research methods that emerged from the sampling process were included as relevant for measuring credibility, dependability and transferability of findings. Edwards et al. (2000) term this prioritizing

‘signal’ (likely relevance) over ‘noise’ (the inverse of methodological quality), the idea being that the various research methods applied in the primary qualitative studies do not develop a correct map of the world but rather a useful one. Table 2.3 maps the final explicit aspects along which the qualitative studies were distributed in terms of trustworthiness. Most importantly, the level of transparency of the research methods reported in the studies began to serve as a basis for how to identify with greater confidence what is trustworthy and transferable in terms of findings.

All descriptions/extracts related to client factors and contextual factors were listed in a spreadsheet to review the individual substance of data along a coding guide. This coding guide served as a coding frame for categorizing codes and was shared with the two coaches as co-coders (Figure 2.2).

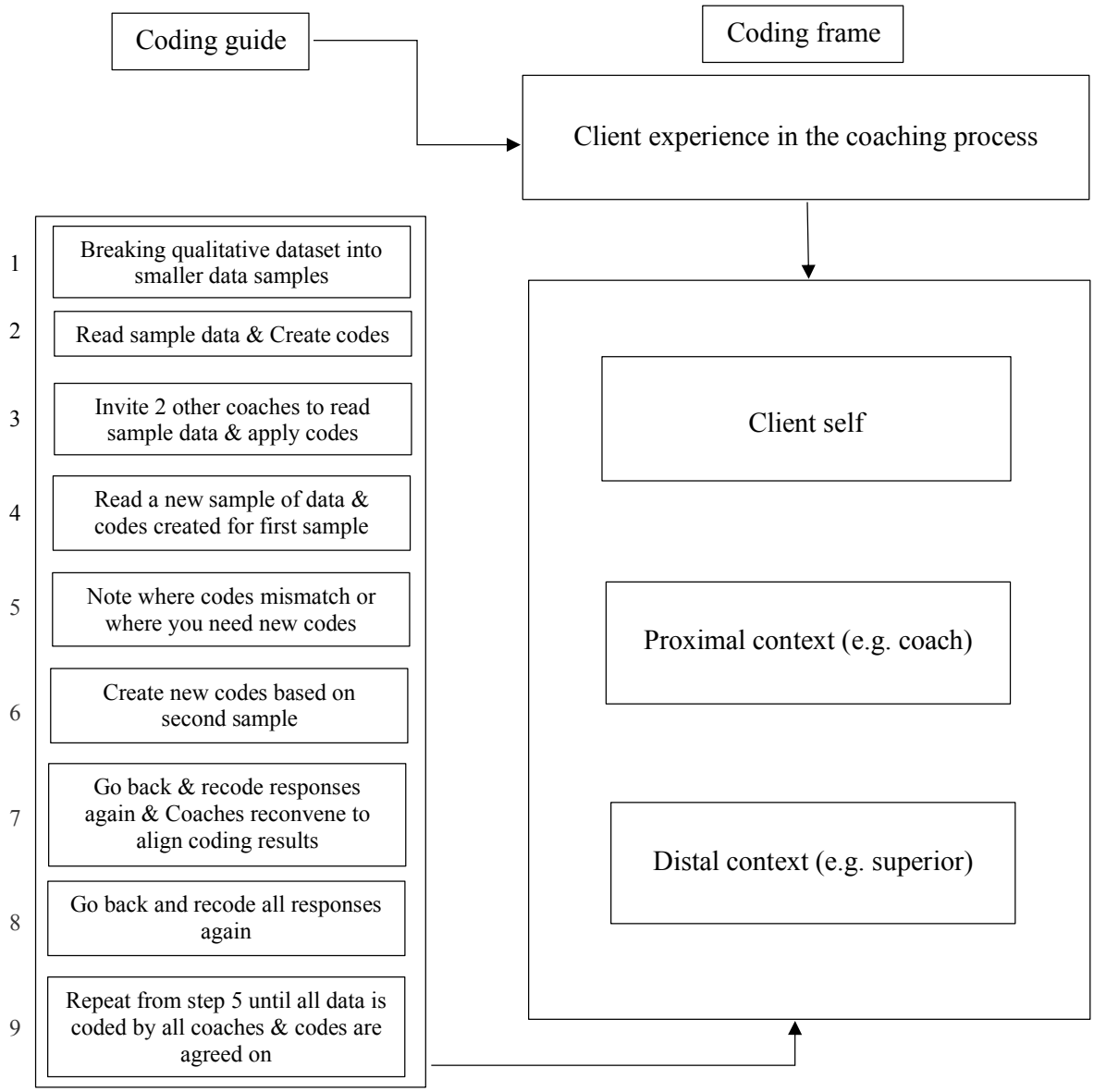


Figure 2.2. Coding guide and coding frames for categorizing codes guided by Barry et al. (1999)

Table 2.3. Trustworthiness of studies - Hierarchy of evidence

Trustworthiness of Evidence	Interaction Analyses	Exploratory Studies	Descriptive Statistics	Case Studies	Interviews
No of articles	8	4	4	44	50
No of participants	356	221	11	558	849
Definition	Jordan & Henderson (1994): interdisciplinary method empirically investigating the interaction of human beings with each other and with objects in their environment; investigates talk, non-verbal interaction, and the use of artifacts and technologies, identifying routine practices, problems and the resources for their solution; roots lie in ethnography, sociolinguistics, ethnomethodology, conversation analysis, kinesics, proxemics, and ethology.	intends merely to explore the research questions and does not intend to offer final and conclusive solutions to existing problems; conducted to determine the nature of the problem, this type of research is not intended to provide conclusive evidence, but helps to have a better understanding of the problem; the researcher ought to be willing to change his/her direction as a result of revelation of new data and new insights.	used to describe the basic features of the data in a study; provide simple summaries about the sample and the measures; together with simple graphics analysis, they form the basis of virtually every data analysis. They distinguish themselves from inferential statistics, which aim to involve further meaning making of data.	single, multiple, or group cases; illustrative, cumulative, exploratory, and critical instance case studies: well suited for identifying "black swans" because of its in-depth approach; cases selected by information-oriented rather than random sampling; may involve a conceptual and later on a practical experiment; experiments, with the benefit of hindsight, are self-evident.	involves "conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program or situation" (Boyce and Neale, 2006, p.3). They can be structured, semi-structured and unstructured.
Inclusion & Exclusion criteria	inclusion criteria: coachee patterns, qualitative or mixed methods, coaching, peer-revied articles, direct or indirect research of client-related factors or coachee characteristics, publication in English, starting in 1990s, across the globe. Exclusion criteria: other sources, low rigour of method (lack of explicit descriptive of thematic analysis)	inclusion criteria: coachee patterns, qualitative or mixed methods, coaching, peer-revied articles, direct or indirect research of active ingredient, publication in English, starting in 1990s, across the globe; Exclusion criteria: other sources, low rigour of method (lack of explicit descriptive of thematic analysis)	inclusion criteria: coachee patterns, qualitative or mixed methods, coaching, peer-revied articles, direct or indirect research of active ingredient, publication in English, starting in 1990s, across the globe; Exclusion criteria: other sources, low rigour of method (lack of explicit descriptive of thematic analysis)	inclusion criteria: active coache patterns, qualitative or mixed methods, coaching, peer-revied articles, direct or indirect research of active ingredient, publication in English, starting in 1990s, across the globe; Exclusion criteria: other sources, low rigour of method (lack of explicit descriptive of thematic analysis); including dissertations	inclusion criteria: coachee patterns, qualitative methods, coaching, peer-revied articles, direct or indirect research of active ingredient, publication in English, starting in 1990s, across the globe; Exclusion criteria: other sources, low rigour of method (lack of explicit descriptive of thematic analysis); including dissertations
Rigour of method	dyadic analysis, sequential analysis, transcriptions, content analysis, conversation analysis	precise hypotheses with or without inferential statistics; place a premium on sensitivity (e.g. detecting all strategies that might be useful)	structural analysis; measures of central tendency / spread; simple summaries of samples and measures	detailed contextual analysis of a limited number of events or conditions and their relationships; a variety of methodologies and rely on a variety of sources	in-depth semi-structured interviews, critical incident technique / content analysis
Dependability	consistency in measuring data / of results / similar results as in interviews or other studies; clarity of data	no conclusive evidence; identifies the boundaries of the environment in which the issue of active ingredients likely to reside, and the salient factors or variables that might be found there and that might be of relevance	represent quantitative descriptions of outcome in a manageable form; patterns emerge from data / method gives data clear meaning	detailed descriptions of specific and rare cases: extend experience or add strength to what is already known; provide the basis for the application of concepts and the extension of methodologies: iterataive or looped processes, aggregation of cases provides naturalistic generalizability; vital information may be missing, making the case hard to interpret and representative of a phenomenon	detailed information, direct control over the flow of primary data collection process; a chance to clarify certain issues during the process if need arises; coding; rigorous methodologica description;
Credibility	triangulation / mixed method designs	triangulation / mixed method designs / loose structure	internal / external validity	triangulation / mixed method designs / multi-rater feedback / loose structure / progress metric and quality reviews	triangulation / involvement of independent coders / mixed designs / 360 degree feedback and psychometric test scales / methods of epoché & bracketing, member checks
Transferability	collaborative process and practice-oriented	collaborative process and practice-oriented		collaborative process and practice-oriented	collaborative process and practice-oriented
Ethics / Limitations	modest number of articles / participants	modest number of articles / participants; interpretations/reflections are subject to bias	modest number of articles / participants; do not allow us to make conclusions beyond the data analysed or reach conclusions	Intense exposure to the study of a case may bias researcher's interpretation of the findings; do not facilitate assessment of cause and effect relationships	interviewee bias: reasearcher's frame of reference (display of viewpoints, conscpicuous appearance)
TRUSTWORTHINESS	**tertiary**	**tertiary**	**tertiary**	**secondary**	primary

2.2.4.2 Data Analysis: Stage Two

To categorize codes, stage two involved the following types of coding: (a) open coding of findings specific to each study type to create concepts; (b) axial coding across the open codes to generate conceptual categories; (c) theoretical coding across the categories towards aggregating dimensions as themes. The ultimate aim was to synthesize themes in a third stage and build interpretive explanations beyond the categorization of themes by study type (Sandelowski & Barroso, 2007). The spreadsheet also served as a codebook to keep track of the codes (e.g. label used for each code, description of the concept the code refers to, who originally coded it, the date that it was originally coded or updated, notes on how the codes relate to other codes).

In applying open coding (Strauss & Corbin, 1990), we identified descriptions of the client as an influencing factor and abstracted them from the context they were embedded in (e.g., field of coaching, organizational development program) and the methods used (e.g., descriptive statistics, dyadic analysis). We labeled these client factors as first-order concepts in faithful adherence to the descriptions. First-order concepts (e.g., tension as unpredictability, lack of courage to change, conformity to norms) were extracted from the articles for each cluster separately. In each cluster, they were compared to identify categories and specific properties of these concepts. This process involved giving phrasal descriptors to the first-order concepts (e.g., belief that coaching is going to be successful was associated with trust). Eye-balling (Yin, 1994) was used for pattern matching through constant comparison to form second-order themes (e.g., anxiety, insight, motivation). This inductive technique was also applied to draw interpretive conclusions in the next step. It became apparent that researchers apply different language to describe similar second-order themes (e.g., willingness to be coached, openness to the process (e.g., Bush, 2005), willingness to try out new behavior or to change (e.g., Hurd, 2009), willingness to look at stuck situations (e.g., Kets de Vries, 2013), or preparedness (e.g., Peterson & Miller, 2005) in their studies, to name but one theme (Figure 2.3). Thus, this second-order

theme analysis represented an initial theoretical stage, in which the question arose how the 'ambiguous identity' (Corley & Gioia, 2004) of some nascent concepts such as willingness, openness and readiness support the description and explanation of the client factors under review through adequate theoretical referents. Conversely, trust described by Boyce et al. (2010) as "mutual confidence that supports the client's willingness to be open, honest and vulnerable and allows the coach to be supportive, non-judgmental and challenging" (Boyce et al., 2010, p. 918) has been widely adopted as a concept (Cox, 2012) in coaching. The same applies to concepts such as bonding, rapport, transparency, self-efficacy and compatibility. They are established features of the coach-client relationship and thus represent workable themes in coaching. Eventually, this theoretical stage culminated in what Glaser & Strauss (1967) termed 'theoretical saturation' as no additional constructs could be identified in the studies. Eventually, the focus of attention was on investigating the possibility to distill the emergent second-order themes further into second-order 'aggregate dimensions' (Corley & Gioia, 2004). Despite linguistic dissonances around a myriad of terms, open and axial codes, and client categories as influencing factors, three distinct aggregate dimensions emerged as the result of the analytical process of building a data structure. The three aggregate dimensions are coded as: emotion, attitude, behavior as described in the Finding section below. Table 2.4 provides a summary of the primary qualitative study types split by aggregate dimensions and context.

Table 2.4. Summary of primary qualiative study types split by aggregate dimensions & context

Aggregate dimension	Case study	Interview	Interaction Analysis	Exploratory study	Descriptive statistics
Emotion	7	15	0	0	0
Attitude	35	33	3	4	0
Behavior	45	38	7	5	2
Context	28	35	3	4	2

Note. Some studies measured multiple dimensions

Figure 2.3 is a graphic representation of the generation of coded themes and aggregation into client-factor dimensions.

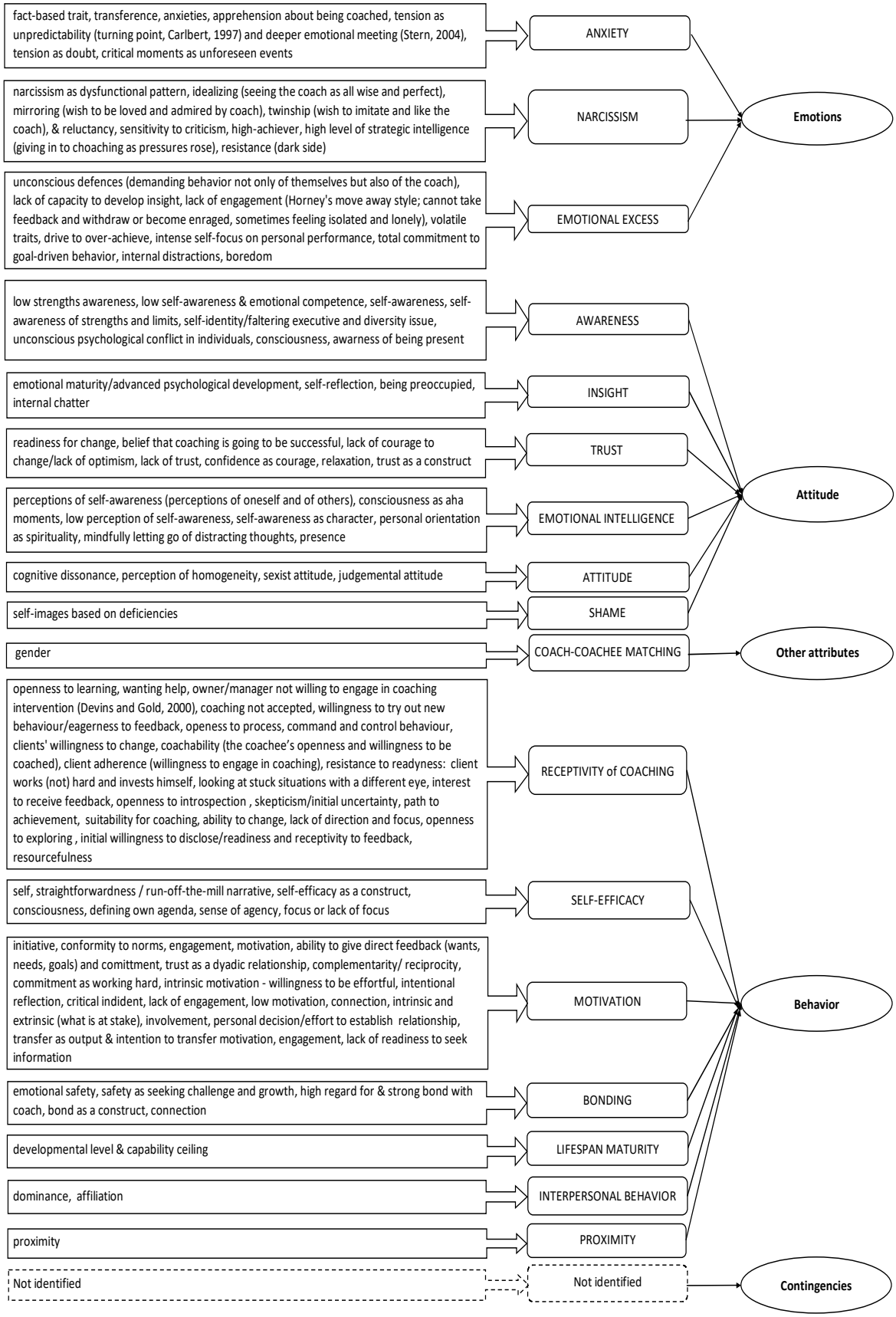


Figure 2.3. Thematic synthesis of client factors

2.2.4.3 Data Synthesis

In a third stage, the themes were synthesized within and across primary studies to "produce a new and integrative interpretation of findings that is more substantive than those resulting from individual investigations" (Finfgeld, 2003, p. 894) and thus to inductively ground theoretical framework on emerging concepts derived from evidence collected.

In identifying signs of interrelatedness between the three aggregate dimensions, stage three incorporated the following activities: (a) constant comparison between aggregate dimensions and interpretations with outcomes at individual study level to identify potential meta-biases (e.g., primary research studies that did not fit within the current array of concepts, constructs and themes; lack of coherence of interpretive explanations), (b) translating studies into one another to draw cross-case conclusions, (c) synthesizing themes in the form of an integrative conceptual model, and (d) theoretical sampling to build confidence in the cumulative evidence by accounting for differences between the client factors and contextual factors in relationship to the emerging conceptual framework.

During the interpretive synthesis process, Hampson's (2012) personality process theory as a key analogy pointed to a core pattern around which to organize the dimensions, leading to a transcending process of relating "seemingly disparate units to each other by an underlying process" (Glaser, 2002, p. 9) and to constructing the theoretical conceptual framework. In specific, this particular path of analogical observation towards creating new theory (Cornelissen & Durand, 2014) involved a constant comparison of all 110 articles in terms of fit between the learning experiences perceived in clients and the core client factors as a transcending process across the articles. The aim was a theoretically informed interpretation of a perceived interrelatedness of client factors and contextual factors revealing patterned shifts for clients in the coaching process as observed in the domain of personality process theory but not yet fully understood and explained in coaching. From a theoretical perspective, such patterns are vital to

answering questions about the facilitation of goal attainment and the translation of the interrelatedness of client factors and contextual factors into coaching effectiveness.

In maintaining quality control, best practice guidelines for synthesizing primary qualitative findings (Dixon et al., 2007) formed the basis for applying the following procedures to ensure quality control in this qualitative meta-synthesis: (a) creating transparency throughout the synthesis process by providing in-depth descriptions and explanations for decisions taken in this meta-synthesis; (b) employing two coaches as co-coders; (c) incorporating established methods to synthesize primary qualitative studies; (d) utilizing established quality appraisal tools; and (e) using an audit trail for documenting decisions and agreements negotiated with co-coders.

In presenting the findings, we faced the considerable challenge of fitting tremendous amounts of evidence-informed data in the word and page limitations typical for peer-reviewed journal articles. In this systematic review this was done in form of thematic analysis and interpretive synthesis as informed by Sandelowski & Barroso (2007) which culminated in an integrative conceptual model to explain Q1 and Q2 to eventually build theory of client experiences of coaching.

2.3 Results

2.3.1 Overview of client factors and contextual factors

First, in the analytic phase, this qualitative meta-synthesis produced three emerging client-factor aggregate dimensions: (a) behavior is found to be studied most extensively (n = 97), (b) followed by attitude (n = 75), while (c) emotion is found to be studied least extensively (n = 22). For this synthesis, emotion is the dimension that is rooted in basic needs and involves feeling (Figure 2.3). It is understood to have varying impact on and to be impacted by the other aggregate dimensions across study types. Attitude manifests itself in the way clients view the world. Attitude bears varying effects and is affected by the other aggregate dimensions across

study types. Behavior reflects competencies and certain inclinations in interpersonal communication as reported in the primary qualitative studies that is partly conditioned by the coach's behavior as a coping style as well as the other dimensions across study types. Second, in the analytic phase, the qualitative meta-synthesis also produced a fourth aggregate dimension ($n = 72$). This dimension relates to the distal and proximal contextual factors as they are reported in the primary qualitative studies to influence client's change process. Figure 2.4 maps the embeddedness of the four aggregate dimensions in client's change process.

While these four aggregate dimensions comprehensively describe client factors and contextual factors present in coaching, descriptions do not explain how these coded dimensions interrelate when it comes to client's learning in coaching (e.g., how trust in coaching relates to client's readiness to be coached).

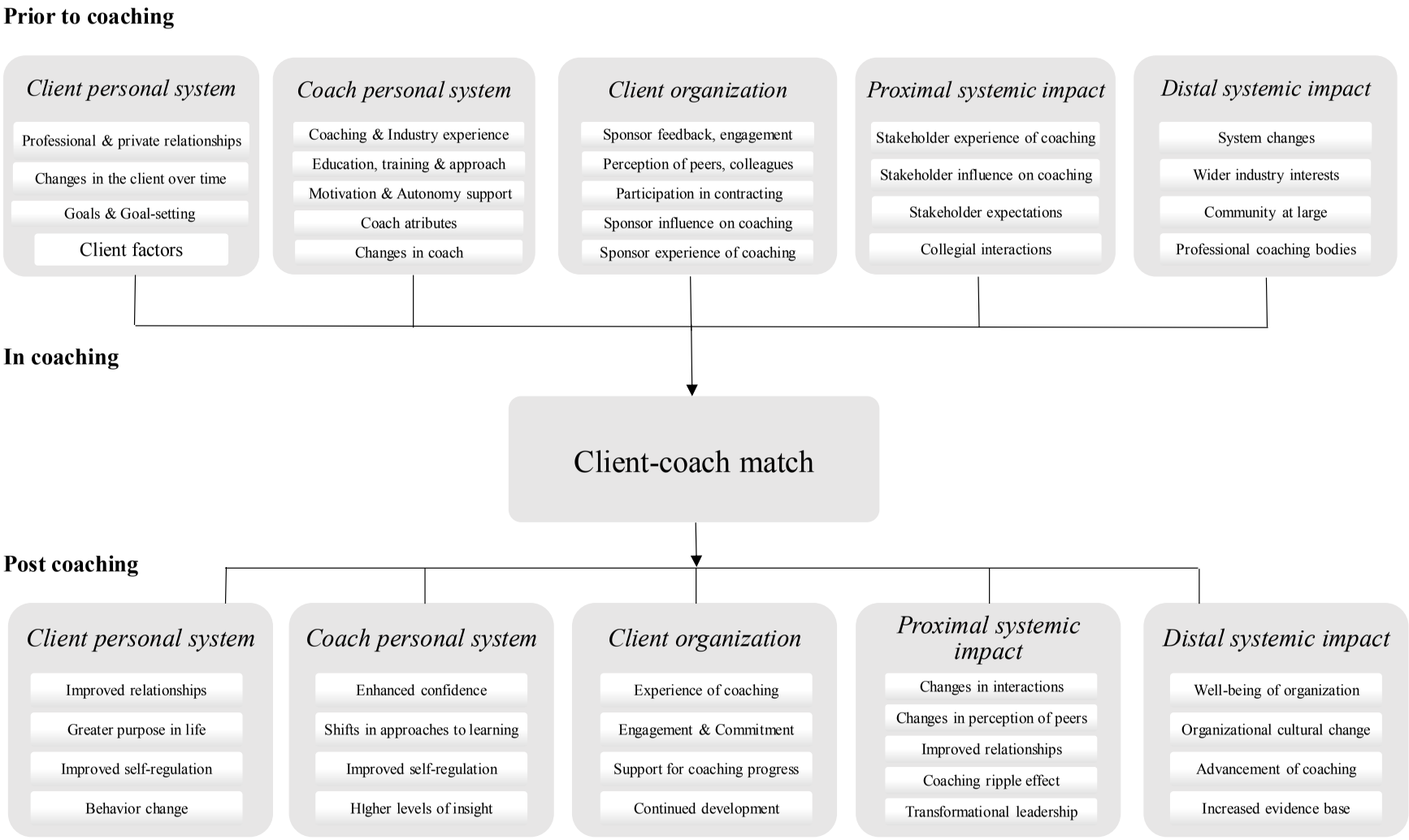
To sustain a theoretical framework of interrelatedness of coded dimensions emergent through interpretation in this meta-synthesis, our narrative presentation below includes verbatim quotes from primary qualitative studies to capture the meaning of the dynamic patterns derived from interpretive synthesis. Verbatim quotes indicate how aggregate dimensions interrelate, that is how client factors and contextual factors impact on or are impacted by one another. Table 2.5 provides a summary of the frequency of interrelatedness for the four aggregate dimensions as dimensional dynamics across all study types.

Table 2.5. Summary of frequency of dimensional dynamics across all study types

Dimensional Dynamics Incidents (occurrence across categories)	**EM >AT**	**EM >BE**	**EM >CO**	**AT >EM**	**AT >BE**	**AT >CO**	**BE >EM**	**BE >AT**	**BE >CO**	**CO >EM**	**CO >AT**	**CO >BE**
Case Studies	15	48	5	21	54	11	7	43	34	6	4	28
Interviews	12	37	5	17	102	8	24	26	21	20	3	69
Exploratory Studies	2	1	1	0	19	2	0	10	1	0	0	2
Interaction Analyses	1	1	0	0	7	1	0	3	2	0	0	3
Discriptive Statistics	1	1	0	0	1	1	0	1	0	0	0	2
	31	88	11	38	183	23	31	83	58	26	7	104

Note. Dimensional dynamics as an expression of the interrelationship of three aggregate dimensions and contextual factors were counted as reported in each primary qualitative article. Some studies reported multiple dynamics across the studies.

Figure 2.4. Client Factors & Distal and Proximal Contextual Factors in the Change Process (based on Grant, 2017)



Notes. Client factors form a sub-category of client's personal system in the change process. This qualitative meta-synthesis reviewed client factors only. 'Client-coach match' as a factor (e.g. de Haan, 2008b, see Table 2) is mapped separately as it may be related to coach and client.

2.3.2 Interrelating client factors and contextual factors

Interrelating client factors. One theoretical lens that has previously investigated how clients learn in coaching is Hampson's (2012) personality process theory. It affords to target the direct (i.e., one factor impacting on some other factor) and indirect (i.e. one factor impacting on some other factor via a third factor) interrelatedness of client factors as well as the direct and indirect effects of contextual factors on outcomes. While the primary qualitative studies under review do not use quantitative descriptors to describe change processes in coaching, concepts (e.g., trust, anxiety) are nevertheless found to refer to as mediating in some studies (e.g., Wales, 2003) or being a 'predictor' (e.g., Peel, 2008) to suggest co-relationality with coaching effectiveness. Ultimately, in this meta-synthesis, only the existence of a certain type of dimensional interrelatedness can be ascertained through interpretation on the basis of verbatim quotes. Apart from presenting dimensions as being directly interrelated using descriptors (e.g., a factor 'affects', 'impacts on', 'leads to', 'relates to', 'results from' another factor) or indirectly interrelated (e.g., one factor leads to another factor through a third factor), the verbatim quotes in the qualitative studies refer to dimensions as positively (e.g. 'facilitate', 'improve', 'will increase', 'is likely to lead to') or negatively (e.g., 'reduce', 'might impede', 'inhibit') affecting the way in which clients progress in coaching across all study types (Table 2.2). In some cases, in the absence of clear descriptors, the coders recurred to their knowledge and experience of coaching to define the positive or negative quality of dimensional interrelatedness (e.g. Cavicchia, 2010). To illustrate dimensional interrelatedness as mapped in Table 5, this meta-synthesis provides some examples of verbatim quotes as they were combined to form dimensional dynamics to answer Q1. For the sake of conciseness, we do not report all the dynamic patterns through verbatim quotes identified in the 110 qualitative studies (data can be obtained on request).

In a study using descriptive statistics (Cavicchia, 2010), shame defined as 'clients' emerging self-image of deficiencies inhibits spontaneity and improvisation' as a capacity (attitude→behavior). It is described as (negatively) influenced by 'clients' susceptibility to feeling unaccepted' (emotion→attitude) and (positively) by 'making use of 'relational bridge' (behavior→attitude). In their case study, Kiel et al. (1996) suggest that client's 'fears of losing winning formulas' and 'fear of change as 'hidden agendas' lead to resistance and reduced leadership effectiveness' (emotion→behavior) and might be (positively) influenced by 'levels of psychological mindedness and trust' (attitude→behavior). Alvey & Barclay (2007) explain how client's 'receptivity to coaching' and 'willingness to disclose honest feelings' might 'foster development of trust' (behavior→attitude). Huggler's case study (2007) postulates that client's 'idealizing (seeing the coach as all wise and perfect)', 'mirroring (wishing to be loved and admired by coach)', 'twinship'(wishing to imitate and be like coach)', might be (positively) influenced by client's 'collaboration' in the coaching (behavior→emotion) via client's 'trust', which is reported to (positively) 'impact their capacity to collaborate' (attitude→behavior).

Interrelating client factors and contextual factors. Similar to the dimensional interrelatedness of client factors described above, contextual factors manifest in a dynamic manner in the coaching process across all study types. They form the basis for interpreting when and how clients engage in coaching and thus reflect the socially constructed nature of coaching. For this meta-synthesis, contextual factors refer to past and/or present milieu-related conditions specific to the coach or client having either proximal or distal impact. They affect and are affected by the other dimensions and are inherent in the circumstances governing a situation (e.g., coach system, client system, client-coach relationship, organisational support). Both more proximal contextual dynamics (e.g., coach's motivation affects client's perceived level of engagement), the coaching engagement (e.g. client-coach match) and client's more distal contextual dynamics (e.g., executive level support, coaching culture increase client's self-confidence and sense of

agency) are derived from the qualitative studies. To illustrate dimensional interrelatedness as mapped in Table 2.5, this meta-synthesis provides some examples of verbatim quotes as they were combined and constantly compared to form dimensional dynamics. For the sake of conciseness, we do not report all the dynamic patterns through verbatim quotes identified in the 110 qualitative studies (data can be obtained on request).

Cavicchia's (2010) article is one example which gives inspiration for how to interpret client factors and contextual factors. The author finds that shame will (negatively) 'impact the coaching relationship as an unproductive pattern of relating' (attitude→context). This study also explains how clients are impacted, albeit 'subtly' by the coach, which (positively or negatively) 'contributes to the feeling and thoughts that arise, the work that unfolds, and the learning that occurs – for both!' (context⇢emotion; context⇢attitude). A recent study (Noon, 2018) exploring presence illustrates how 'being physically interrupted by coach supports clients' regaining engagement' (context→behavior) as well as how coach's 'making eye contact or direct feedback from coach facilitates clients' presence' (behavior→attitude), which implies that coach as a context through own behavior had a positive impact on client (context⇢attitude). Huggler (2007) finds that 'narcissistic clients' collaboration is (positively) related with affect containment' (emotion→behavior) 'through coaches' empathic attunement' (context⇢emotion), which 'builds up trust' (context→behavior). Mansi (2007) reports that client's 'empathy, level of guilt, anxiety impact on their effectiveness as leaders' through extreme levels of volatile behavior including angry outbursts, hostile verbal and non-verbal communication' and that 'will have potentially disastrous consequences for the individual and their organization' (emotion→behavior; emotion⇢context). Based on 56 critical moments de Haan (2008a) indicates that client's 'turn calm as they are positively affected by coaches' calmness, openness, authenticity, ability to doubt and greet what comes next with questions' (context→behavior) in response to client's 'lack of confidence in and acceptance of coach' (context⇢attitude) as a result of 'tension as doubt' in clients (emotion→attitude). This dynamic

is experienced as ‘critical moments’ as breakthrough moments in the coach-client relationship as reported by coaches.

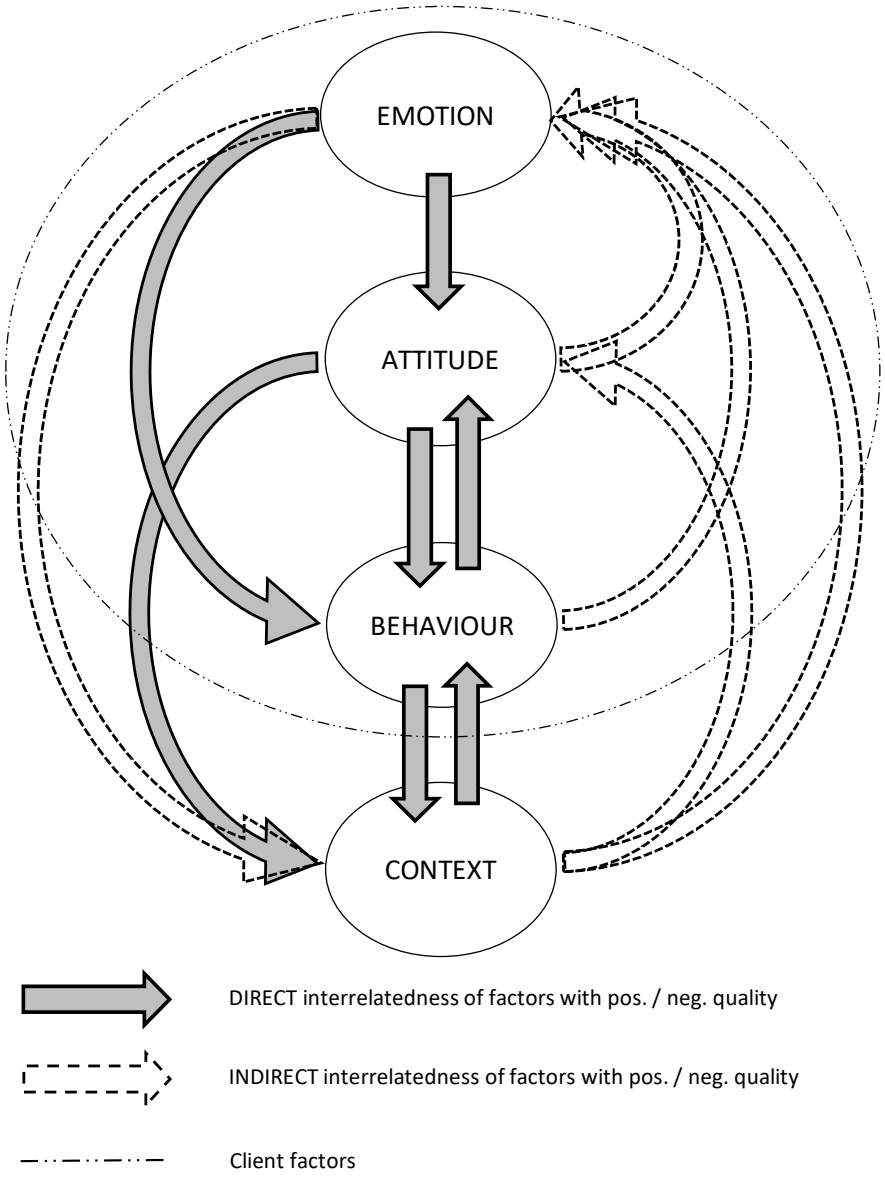
To sum up, seven (7) dimensional dynamics indicate a direct relationship while five (5) dynamics imply an indirect dimensional interrelatedness as reported in the studies (Table 2.5). Most strikingly, emotion is identified as the only dimension that directly relates to the other dimensions (attitude and behavior). Furthermore, emotion is the dimension that is only indirectly – via a third factor - influenced by the other aggregate dimensions unlike behavior which is identified as the only dimension directly influenced by the other three dimensions. Similarly, behavior is the only dimension that involves five direct dynamic relationships as reported in the studies. However, behavior is not reported to directly relate to emotion. Nor is attitude reported to directly relate to emotion.

Consequently, in conducting a constant comparison of client factor dynamics across all study types and in providing a possible conceptualization of how these four dimensions interrelate as inspired by the findings in the primary qualitative studies, we lay the foundations for building theory to encourage future research. This conceptualization was developed through interpretive synthesis and is presented below.

2.3.3 Integrative Relationship Model

The Integrative Relationship Model (IRM) captures six (6) dimension pairs (Figure 2.5).

Figure 2.5. Integrative Relationship Model of client factors and contextual factors



Notes. Direct interrelatedness is implied when one factor impacts directly on the other as reported in the studies. Indirect interrelatedness is implied when one factor impacts on another factor via a third factor as reported in the studies. Positive and negative quality of interrelatedness is deducted from descriptors used in verbatim quotes. Constant comparison of direct and indirect as well as positive and negative dimensional dynamics across all study types identified how dimensions (emotion, attitude, behavior and contingencies) are embedded in coaching. A transcending non-linear process reveals patterned shifts for clients in the coaching process as observed in the domain of personality process theory but not yet fully understood and explained in coaching as a socially constructed change process. In analogy to "Personality Processes: Mechanisms by which Personality Traits 'Get Outside the Skin'" by S. Hampson (2012), *Annual Review of Psychology, 63,* 315–33.

First, it highlights the core essence of emotion in coaching engagements: client's inner world as expressive of emotion emerges as important for them. Second, it maps how client factors potentially integrate proximal and distal contextual factors as they might affect when and how

clients engage in coaching. In effect, clients are agentic learners in interaction with others rather than an isolated self from others and situations.

Consequently, IRM purports that client's experiences can be conceptualized from (a) a lens of dynamic interrelatedness as clients undergo their change process, and (b) a nuanced perspective of dynamic interrelatedness as they emerge in client's social contexts. In this model, dynamics between aggregate dimensions occur directly–one dimension affecting another dimension (see → in the model)–and also indirectly–via a third dimension (see ⇢ in the model) –where these are associated in the same coaching engagement. As such, the model does not offer new insights into intrapersonal or interpersonal dynamics. Instead, it demonstrates the prevalence of the codes that this meta-synthesis produces and offers the basis from which to draw conclusions for future empirical research on coaching effectiveness. The aim is to balance the current bias in coaching literature around the client factors and contextual factors that are studied and the ones that need to be investigated with a more process-oriented perspective both in qualitative and quantitative research. This will ultimately support coaching service providers in navigating the demands of increasingly competitive learning-based interventions in organizations (Clegg, 2005).

2.4 Discussion

As coaching research tends to revolve around measuring goal-attainment mostly the measurables seem to be in the foreground. Therefore, we have insufficient focus on the client with a specific emotionality. Additionally, given the present state of disconnected facts and experiences in the extant literature on how client factors and contextual factors interrelate in coaching we advocate that an integrative theory will progress research endeavours into the body of knowledge about how coaching works. We argue that the relative consistency of the dynamic patterns arrived at through constant comparison of qualitative text data supports the trustworthiness and dependability of emerging insights on what might be relevant dynamics to

investigate in future qualitative and quantitative research. In consolidating the dispersed body of this influential area of research, this meta-synthesis makes two specific contributions:

First, this qualitative meta-synthesis indicates that emotion is a factor that is heavily under-researched and under-theorized in coaching. As the majority of the studies was identified to explore behavior as a goal-attainment measure in this meta-synthesis, we suggest that the relevance of emotion as a key factor that affects coaching outcomes remains overshadowed. The direct interrelatedness emerging between behavior and the other three dimensions implies that coaching research has placed the focus on measuring shifts in behavior for goal-attainment. However, this approach harbors the risk of overlooking the other three dimensions. IRM maps that these other three dimensions might directly and indirectly influence behavior. Specifically, findings give inspiration to propose that emotion (e.g., fear, anger, uncertainty, emotional excess) might lead to client's propensity for certain behaviors in specific situations, which is consistent with quantitative research findings (MacKie, 2015). Indeed, paying attention to emotion is necessary if we wish to deepen our understanding about the irregularities that coaches encounter when applying certain coaching methods (e.g., GROW model) that prove to be effective with certain clients while they appear ineffective with some others. Latest neuroscience research into emotion (Barrett, 2017) shows how little we know about coaching client's emotionality and how risky it is to simply guess client emotions. Barrett's (2017) breakthrough is to explain that our brain constructs an interpretation and then relates it to various past experiences and their related resource balances, which manifests in emotion types such as anger, fear and sadness. These emotions convey the meaning of the experience to clients. Hence, our call is to explore emotion both in qualitative and quantitative research on coaching effectiveness as it appears to influence behavior (e.g., fear or uncertainty leading to resistance and lack of engagement). Inevitably, investigating emotion in quantitative research implies methodological challenges researchers encounter in their meaning making of outcomes

as coaching constantly seeks to strike a balance between looking at the 'whole person' (Taylor, 1998) and looking at one isolated facet of that person (i.e., professional role or behavior).

Second, while the body of knowledge comprising client factors and contextual factors is evolving, a theoretically informed interpretation of a perceived interrelatedness of these factors has remained unaddressed to move research on coaching effectiveness towards a consolidated evidence base (e.g., Athanasopoulou & Dopson, 2018). In response to the paucity of conceptual propositions (Grant, 2017) for future research, this meta-synthesis produces IRM that maps the way in which client factors and contextual factors are interpreted to dynamically interrelate in coaching as a context-sensitive process. As an integrative model, IRM follows McDowall's (2017) call to go beyond taxonomy-specific assessments of behavioral change to deepen our understanding of how coaching as a context-sensitive and dynamic change intervention can aid client's development as a meaning-making process. Indeed, research has increasingly viewed coaching as an input-output practice rather than a process-oriented activity (Greif 2017) with coaches delivering coaching and clients being the recipients of coaching. While such an input-output approach to coaching research has considerably enhanced our understanding of coaching effectiveness, it ignores the possibility of coaching being socially constructed. Coaching practice tends to remain decontextualized (Cavanagh, 2013). Yet, any investigation into coaching is necessarily incomplete unless both client factors and contextual factors are considered to account for the dynamically patterned context-sensitive nature of coaching. Findings in this meta-synthesis (e.g., Ben-Hador, 2016; Nanduri, 2018) challenge propositions (Bachkirova, Sibley, & Myers, 2015) that the context in which coaching takes place does not account for major influences on coaching outcomes. While and where coaches as client's proximal context are skilled and might display attitudes that cannot be identified as impacting the coaching process, some studies suggest that coach's emotions and behaviors are possibly affecting client's change processes, both in a positive and negative way (e.g., de Haan & Nieß, 2015; Ianiro & Kauffeld, 2014). Thus, we argue that coaches need to develop a quality

of mind that can grasp the interplay between other, society, and self if we were to progress the body of knowledge in coaching as a context-sensitive area of human relations. We believe that this can be achieved through a capabilities-based approach rather than a competencies-based framework when training and assessing coaches and coaching effectiveness (Bachkirova & Lawton-Smith, 2015).

Conclusively, this meta-synthesis supports calls (Terblanche 2014) for applying the relatively novel methodology of Social Network Analysis (SNA) to investigate coaching based on the interactional perspective offered in IRM. IRM argues that interpretations of a possible underlying interrelatedness through which qualitative researchers found client factors and contextual factors to explain when and how clients might engage in coaching serve as conceptual resource (Bachkirova, Arthur, & Reading, 2015) to scholars in coaching psychology wishing to measure how these factors translate into coaching effectiveness in an integrative manner.

2.5 Limitations

This qualitative meta-synthesis reflects efforts to provide a reproducible systematic synthesis with minimal researcher bias. Yet, it has three discernible limitations. First, although we provide a comprehensive overview of how client factors and contextual factors dynamically interrelate to further our understanding of underlying mechanisms, we recognize that the dimensions mapped in IRM cannot be viewed as entirely conclusive. We have no results that validate or contradict our model. Second, the relevance of the interrelatedness of client factors and contextual factors as instrumental processes cannot be ascertained given the lack of statistical value of the dimensional relationships identified through interpretive synthesis. Third, despite endeavors to include all coaching-specific and coaching-relevant articles, we acknowledge that the decision to exclude keywords such as ‘sports’ and ‘clinical’ from

electronic searches may have caused the unintentional exclusion of some papers from this synthesis.

2.6 Conclusion

In systematically synthesizing 110 primary qualitative studies, we find that client's 'inner world' – that is their emotions - is rarely the subject of coaching research. Yet, the coding results seem to show that emotions count as in conversations client's inner world emerges as important to them. We find that emotions are overlooked both in qualitative and quantitative coaching research. Most scientists investigate some cognitive types such as trust, self-efficacy or commitment but hardly anyone explores how emotions play out in the coaching process when investigating effectiveness in coaching. We do not mean to indicate that intrapersonal processes are a new insight. Instead, in reporting about the prevalence of the codes in this meta-synthesis, we argue that a lot can be further explored in terms of intrapersonal dynamics in coaching through qualitative and quantitative research. Therefore, we argue for an understanding of coaching as client's dynamic change process. On the one hand, we propose that in order to discover, examine and understand client's nuanced behaviors, we ought to focus on both client's self and their social world as they interrelate in coaching. Without this awareness of totality, we cannot claim to fully understand coaching. We advocate that the interrelatedness of client factors and contextual factors as introduced in the Integrative Relationship Model (IRM) form the linchpin of future quantitative approaches to coaching outcome research (Sheldon et al., 2015). On the other hand, we argue that IRM indicates a shift from coaching as merely a linear input-output practice for enhancing performance towards adopting dynamic system perspectives in social psychology that reflect the multi-faceted nature of coaching practice and research (Cavanagh, 2013). Without adopting the patterned dynamics that represent the integrative nature of coaching, we might remain deprived of exploring a key educational

opportunity for addressing the responsibility of coaches as enablers of meaning-making (Drake, 2015) beyond goal-attainment.

Chapter 3. Changing beyond Goals in Coaching: The ABCDs of the Big5 & Affective States in Authentic Self-Development

3.1 Introduction

Drawing on literature from the behavioral sciences (e.g., Gregory et al., 2011; Locke, 1996), the goal-attainment theory of coaching (Grant, 2002, 2006, 2012) posits that in its core coaching is a goal-directed change intervention for narrowing the gap between client's current situation and their desired end-state (Heckhausen, Wrosch, & Schulz, 2010). Subsequently, the body of research on goal-driven approaches to coaching effectiveness has grown considerably (e.g., Athanasopoulou & Dopson, 2018; Bozer & Jones, 2018; de Haan, Grant, Eriksson, & Burger, 2016; Grover & Furnham, 2016; Jones et al., 2016a; 2016b; Theeboom, Beersma, & Vianen, 2014). Yet, coaching is ultimately linked to authentic self-development (Sheldon & Kasser, 1998) as the 'over-arching goal of the coaching enterprise' (Grant, 2012, p. 161). It is expressive of client's actualized 'personal well-being and sense of self' (Grant, 2012, p. 146). Conceptually, authentic self-development is mostly attributed to client's intrinsic goal-orientation and self-concordance in coaching (Spence & Oades, 2011). Intrinsic goal-orientation and self-concordance relate to the three basic human needs of autonomy, competence and relatedness as expressed forms of self-determination (Deci & Ryan, 1985). They refer to the degree to which a goal is aligned with individuals' intrinsic interests, needs, values and motivations (Sheldon & Elliot, 1998; Sheldon, Prentice, Halusic, & Schüler, 2015). Despite the recent surge in literature on authenticity (Sutton, 2020), the mechanism by which clients attain authentic self-development has remained a black box in coaching as a change intervention. Therefore, this paper will focus on how client's sense of authentic self develops through coaching over time. Specifically, the client's capacity to regulate their affect states at session level was investigated in a longitudinal study as a potential mediator of the associations between client's personality characteristics and authentic self-development in client's goal pursuit.

3.1.1 Affect, Behavior, Cognition, and Desire in Personality Traits

The wide acceptance of the Big Five model as one of the most powerful predictive models of trait personality (e.g., Costa & McCrae, 2006; DeYoung, Weisberg, Quilty, & Peterson, 2013; Fleeson & Jayawickreme, 2015) has been critical for advancing our understanding of the role of personality in measuring the effectiveness of coaching because the model provides a common framework for the organization of personality constructs. Specifically, in a study investigating the mean levels of personality traits (Jones et al., 2014), extraversion was associated with self-reported benefits of coaching, while Stewart, Palmer, Wilkin and Kerrin (2008) found openness, conscientiousness, and emotional stability to be antecedents of client's self-reported transfer of learning. Despite the attempt to investigate the predictive value of client's personality traits on coaching, studying mean levels of the Big Five constructs has produced sparse findings, which are mostly descriptive in nature. They do not explain why and how certain traits lead to client's goal attainment. Furthermore, we have no understanding of the specific relationship between client's personality and their authentic self-development as the ultimate goal of coaching across sessions.

It may be fruitful for coaching research to conceptualize client's Big Five traits (John & Srivastava, 1999) as coherent patterning over time, space and situations (Revelle, 2007; Wilt & Revelle, 2009, 2015) of affect (A), behavior (B), cognition (C), and desire (D) of the Big Five trait model (John & Srivastava, 1999). The ABCDs represent four distinct modes of effective functioning (e.g., Ortony, Norman, & Revelle, 2005) Affect refers to a higher-order category comprising one's patterns of moods, emotions, feelings, feeling-like states, and preferences. Behavior constitutes a person's physical and directly observable (e.g., moving, talking, etc.) or less directly observable (e.g., increases in heart rate) actions. Cognition relates to the process of meaning-making of a person's environment reflecting thoughts, beliefs, and modes of thinking

and problem-solving. Desires represent goals, wants, strivings, and motivations that are reflected in the tendency to behave in certain ways.

The ABCD components of the Big Five trait model emerged in personality psychology in response to repeatedly voiced criticism of trait taxonomies as a *'chaotic plethora of personality constructs that sometimes differ in label while measuring nearly the same thing'* (Funder, 2001, p. 200). The objective organization of trait dimensions into ABCDs and the creation of relatively pure measures of ABCDs of each Big Five trait may ameliorate our understanding how and why traits are related to criterion variables (Wilt & Revelle, 2015; 2017). Moreover, it allows for investigating which components are related to other domains of personality (e.g., healthy functioning in daily life) paving the way for studying the temporal and spatial dynamics of personality (Carver & Scheier, 1982; Read et al., 2010; Revelle & Condon, 2015).

Consequently, some scholars with an integrative approach to personality theory (e.g., Condon & Revelle, 2014; Cramer et al., 2012; DeYoung, 2015; Hampson, 2012) call for placing greater attention on the potential mechanisms of the affective, behavioral, cognitive and motivational components associated with the Big Five traits. These scholars indicate that it is the ABCD-level qualities which constitute these personality traits that will explain their effect (e.g., Judge & Kammeyer-Mueller, 2012; O'Neill & Steel, 2017; Wilt & Revelle, 2015) when a person engages in a certain activity over a specific time span (Fleeson & Jayawickreme, 2015). They claim that the current descriptive research development is likely to obscure the full predictive value of personality variables (e.g., Oswald & Hough, 2011, Oswald, Hough, & Ock, 2013).

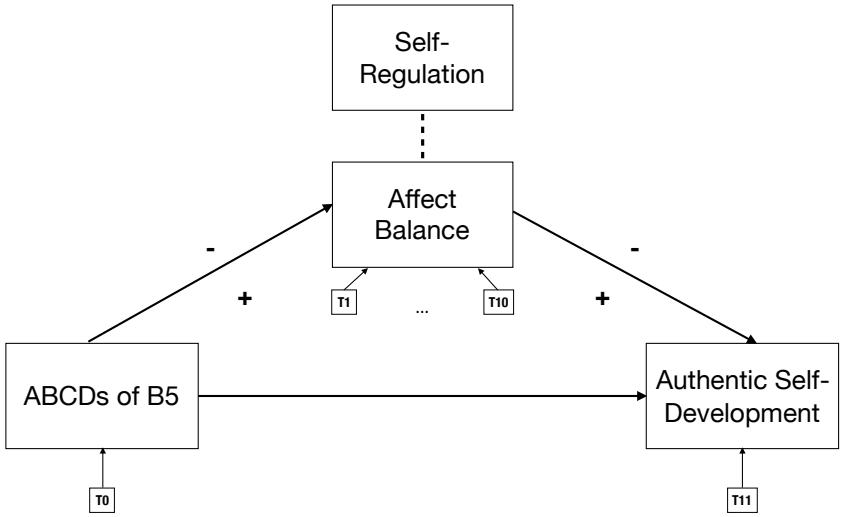
3.1.2 Traits, ABCDs, and Authentic Self-Development in Coaching

Focusing on ABCDs may add to our understanding of how traits associate with authentic self-development. For instance, various studies have shown that the ABCD approach may be fruitful for studying the relations between personality and pro-social behavior (Schmitz, 2017), mental health (Wilt, 2014), health-promoting behavior (Sirois & Hirsch, 2015), goal attainment (Wilt,

Bleidorn, & Revelle, 2016), academic and work performance, and creative achievement (DeYoung, Carey, Krueger, & Ross, 2016; Kaufman et al., 2016) are meaningful to investigate which ABCDs are related to other domains of personality. Yet, there has been no emphasis in coaching research on the possible dynamic nature of personality linking ABCDs of the Big Five traits and authentic self-development in coaching engagements. Subsequently, examining such associations through the structural lens of ABCDs plays an important role in enhancing our understanding of the ways in which clients may change over time and across sessions in line with their personality traits. Figure 3.1 below depicts the basic prediction model with the line of hypotheses.

Hypothesis: ABCDs of client's Big Five personality traits have an indirect and positive relationship with authentic self-development, via affect balance.

Figure 3.1.
Basic prediction model



Note: Basic prediction model, in which ABCD stands for A (affective), B (behavioral), C (cognitive), and D (desire) facets of the B5 (Big Five Personality Model): Self-regulation as measured through affect balance is predicted to moderate the relationship between the ABCD facets of the Big Five traits (Agreeableness, Conscientiousness, Emotional Stability, Extraversion, Openness) and authentic self-development. T0 indicates pre-coaching assessment of ABCDs of B5, T1 … T10 indicates the post-session assessment of Affect Balance as per dyadic engagement, T11 indicates the post-coaching assessment of Authentic Self-Development three months after completion of the coaching engagement.

Given the lack of knowledge in coaching research why personality traits are associated with effective outcomes of coaching (McDowall, 2017; Myers, 2017), understanding the conditions under which ABCDs of personality traits result in authentic self-development is important. In

particular, it is important to determine at a micro-analytical level why ABCDs of personality traits lead to some clients having difficulty attaining authentic self-development in their goal pursuit, while others are more successful at reaching and maintaining their authentic development, perhaps due to some additional intra-individual factors such as mood. We propose that in addition to the qualities associated with personality traits, states and the ABCDs, there are underlying self-regulation processes that may be involved (Sirois & Hirsch 2015; Wilt, 2014; Wilt et al., 2016). Engaging in authentic self-development can be viewed as the prototypical self-regulatory task (Gardner, Dishion, & Connell, 2006; Grant, 2012; Ryan & Deci, 2004; Sheldon & Elliott, 1998) because to a certain extent it requires monitoring and regulating emotional states to maintain focus on long-term consequences of developmental behavior rather than giving in to the immediate rewards of inauthentic choices (Kuhl 2001; Kuhl & Fuhrmann, 1998). A self-regulation lens with coaching influencing the relationship between personality traits as explored through the ABCDs of the Big Five model and authentic self-development through affect balance may enhance our understanding of why certain traits promote or prevent client's authentic self-development.

Theoretically, the conceptual framework found adequate for mapping the links between personality and authentic self-development is the Self-Regulation-Model (SRRM) by Sirois (2015a, b). Building on cybernetic control theories of self-regulation (Carver & Scheier, 2009) and strength models of self-regulation (Baumeister, Vohs, & Funder, 2007), the SRRM was originally developed and tested to explain the links between personality and health behaviors (Sirois, 2015a, 2015b). The SRRM model integrates the relative balance between positive and negative affect. Some scholars claim that positive affect is a self-regulation resource in that it promotes a future-oriented mindset (Sirois, 2014), attenuates stress (Frederickson, 2001), and restores an individual's self-regulatory capacities (Tice, Baumeister, Shmueli, & Muraven, 2007). Yet, it is a limited resource (Sirois, 2015a). Negative affect is asserted to play a central role too. In the presence of negative affect individuals will engage in short-term mood repair in their attempt to self-regulate or will choose short-term rewards in situation where the brain detects

threats (Sirois, 2014), which will hamper goal-directed activities (e.g., Sirois & Pychyl, 2013; Tice, Bratslavsky & Baumeister, 2001). Hence, both affect states can interfere with self-regulatory capacities as is widely accepted in self-regulation literature (e.g., Conner 2013; Wagner & Heatherton, 2015).

To date, we have no evidence supporting the value of the SRRM model for explaining why personality traits relate to authentic self-development in client's goal pursuit in coaching. Yet, there may be good reason to posit that personality does relate to affect balance given research documenting associations between the Big Five personality traits and affect both in healthy populations and patients with chronic diseases. For instance, a meta-analysis (DeNeve & Cooper, 1998) reviewing the importance of Big Five personality traits for life satisfaction as a key element of subjective well-being (SWB) reports that extraversion, neuroticism, and conscientiousness are the strongest predictors for positive and negative affect. Yet another meta-analysis (Steel, Schmidt, & Schultz, 2008) reveals that 39% of the variance in overall quality of life can be explained by all Big Five personality traits. In detail, this meta-analysis reports that 29% of the variance in negative affect can be interpreted by neuroticism, 19% in positive affect can be accounted for by extraversion. Most significantly, conscientiousness has been confirmed to be the strongest factor predicting longevity, health ratings, illness burden, and even disease progression (Bogg & Roberts, 2013; Roberts, Walton, & Bogg, 2005). Additionally, we have some limited support from literature on health-promoting behaviors (e.g., Sirois, 2015a, 2015b; Sirois, Kitner, & Hirsch, 2015a; Sirois, Molnar, & Hirsch, 2015b) determining why certain mid-level personality traits (e.g., self-compassion, perfectionism) are associated with the practice of health-promoting behaviors as mediated by positive and negative affect, or the linkage between conscientiousness and neuroticism and affect balance as a relatively unexplored approach in relation with personality research (e.g., Gónzales et al., 2014; Sirois & Hirsch, 2015).

Building on this comprehensive evidence base linking personality and affect, affect balance as the relative level of positive and negative affect can be used to assess the associations between the ABCDs of the Big Five personality traits and authentic self-development over time in coaching. The idea is that higher levels of positive affect relative to negative affect are likely to lead to replenish self-regulatory resources sufficiently to ensure successful goal-directed functioning (Sirois, 2015b).

3.1.3 Overview of the present study

The present investigative approach represents a longitudinal coaching engagement sampling study including pre-engagement measures of personality traits as predictors and post-engagement measures of authentic self-development as outcome variables. Additionally, it utilizes repeated post-session measures of affect balance as a mediator; in the course of the study, clients completed up to 10 coaching sessions rating affect balance within 24 hours after completion of each session. This design allows us to examine whether affect balance (mean level and slope) mediates the associations between personality traits and client's authentic self-development.

3.1.4 Contribution of the present study

In summary, this study contributes to the coaching process and goal-attainment literature in five ways. First, we develop the theoretical proposition outlining the indirect effects of ABCDs of the Big Five personality traits on client's authentic self-development via affect balance as a self-regulatory mechanism (Figure 1). Second, by investigating the mediating effects of affect balance over coaching, we offer a complementary perspective to research conducted on the mean effects of the Big Five personality traits on the effectiveness on coaching. Third, in the process of testing affect balance as a mediator of the relationship between the ABCDs of personality traits and authentic self-development, the present study enhances our understanding of the effects of personality and whether and/or in what ways client's self-regulatory capacities might alter these

effects. Fourth, as McDowall (2017) suggested, a direction for future research is to investigate the consequences of personality for coaching service providers and professional training bodies, as only longitudinal research can bring to light both the direct and indirect influences of personality on how clients behave in coaching in their complexity. Finally, by enhancing our understanding of (i) how client's nuanced personality contributes to the process of change and (ii) how client's capacity to self-regulate influences authentic self-development, skillful professional coaches can work more effectively with clients. In particular, coaches may assist clients in achieving purposeful positive change that enhances their workplace performance and professional working life as the over-arching goal of the explicitly or implicitly goal-focused coaching enterprise itself (Grant, 2012).

3.2 Methods

3.2.1 Design

Several international professional coaching bodies, organizations pooling internal or external coaches, and professional coaches specialized in various fields of coaching ranging from leadership coaching, career management and business coaching were involved in establishing the framework for recruitment. This study was designed to investigate process measures by observing client's change over time and to engage a maximally naturalistic sample (certified coaches, common clients, no students, international participation) to reflect the realities of coaching engagements as richly and authentically as possible. Thus, the data obtained in this study may be considered to derive from a comprehensive convenience sample (Jager, Putnick, & Bornstein, 2017).

3.2.2. Recruitment

The coach-client pairs (N = 176) recruited for this study comprised female-only pairs (n = 94; 53.4%), male-only pairs (n = 14; 8%), and mixed-gender pairs (n = 68; 38.6%). In particular, coach-client pairs had the following gender mix: female-coach male-client pairs (n = 51; 29%), and male-coach female-client pairs (n = 17; 9.7%). Recruitment involved rigorously selecting professional coaches for enrollment, each in individual in-depth application interviews. Each interview was conducted by the researcher (*corresponding author) and lasted a minimum of 60 minutes to ensure coaches met the criteria identified as essential for participation. The dedicated research website created for this study was designed to feature transparent participation requirements and in-depth instructions about coach's and client's engagement in this study. The recruitment phase ran from May 2018 through to October 2018. The research design was presented at several professional conferences across the globe to ensure the successful recruitment of a minimum research population (N = 150) for statistical relevance. This study received an ethics approval from the research institute. Both coaches and clients signed a written informed consent agreeing on being involved in this study. Clients completed 1 pre-coaching questionnaire, post-session questionnaires after each session, and 1 post-coaching questionnaire three months after completion of this study. For privacy and data safety reasons, questionnaires were all administered online and clients received questionnaire links via their coach. Data collection for N = 176 coach-client pairs was conducted between October 2018 and October 2019. In this study coaches were invited to recruit their clients themselves and perform up to 10 dyadic interactions in the data collection period with a minimum duration of 60 minutes per dyadic interaction as is standard in coaching. Given the naturalistic design of the study, coaches were invited to time and clock their coaching engagements as they normally would outside the research project.

3.2.3 Participants

The dyads involve participants from 31 countries (Table 3.1), which reflects participants' culturally diverse background. Coaches (N = 96) were predominantly female (n = 77; 80.2% vs

male n = 19; 19.8%). Clients (N = 176) had a slightly more balanced distribution in terms of gender (female n = 111; 63.1% vs male n = 65; 36.9%). Client age characteristics were more or less mixed (age <26 n = 9; 5.1%; age cluster 26-45 n = 99; 56.6%; age cluster 46-60 n = 58; 33.1%; age >60 n = 9; 5.1%; invalid entries n = 1), which could be expected based on the recruitment strategy identified for this study.

Table 3.1.
Frequency Distribution of Sample by Country

Country	Frequency Distribution		
	Frequency	Valid Percent	Cumulative Percent
Australia	7	4	4
Austria	2	1.1	5.1
Belgium	4	2.3	7.4
Brazil	4	2.3	9.7
Canada	3	1.7	11.4
Chile	2	1.1	12.5
China	2	1.1	13.6
Czech Republic	4	2.3	15.9
Denmark	2	1.1	17
Ecuador	4	2.3	19.3
Egypt	2	1.1	20.5
Finland	2	1.1	21.6
France	1	0.6	22.2
Greece	9	5.1	27.3
Hungary	2	1.1	28.4
India	5	2.8	31.3
Indonesia	4	2.3	33.5
Ireland	2	1.1	34.7
Italy	4	2.3	36.9
Japan	2	1.1	38.1
Lithuania	2	1.1	39.2
Netherlands	21	11.9	51.1
Poland	2	1.1	52.3
Romania	2	1.1	53.4
Saudi Arabia	19	10.8	64.2
Singapore	1	0.6	64.8
Slovenia	4	2.3	67
South Africa	3	1.7	68.8
South Korea	2	1.1	69.9
United Kingdom	33	18.8	88.6
USA	20	11.4	100
Total	176	100	

Note. Frequency indicates the number of participants per country. The Valid Percent column shows the percentage that does not include missing cases. Cumulative Percent adds the percentages of each region from the top of the table to the bottom, culminating in 100.

3.2.4 Instruments and Measures

3.2.4.1. Affect, Behavior, Cognition, and Desire Facets in the Big Five Traits (ABCDs)

We used the 140 items of the ABCDs in the Big Five (Wilt & Revelle, 2015), which were drawn from the IPIP (ipip.org) versions of the 300 items revised NEO inventory (NEO-PI-R; Costa &

McCrae, 1992b) and the 485 items of the Abridged Big Five Circumplex (AB5C; Hofstee, de Raad, & Goldberg, 1992). Each personality trait scale contains 28 items. The amounts of ABCD content are balanced as 7 items correspond to each ABCD component in each 28-item trait scale. Example items for emotional stability are: "Have frequent mood swings (R)" (Stable Affect), "Barge in on conversations (R)" (Respectful Behavior), "Am easily confused (R)" (Composed Cognition), and "Want things done my way (R)" (Tolerant Desire). Items are rated on a 6-point Likert scale. Scores range from 1 ("strongly disagree") to 6 ("strongly agree") and are averaged across items to indicate general agreement on item level.

3.2.4.2. 120-item version of the revised IPIP-NEO Personality Inventory

The ABCD scales have not been validated extensively. Therefore, we sought to compare the predictive validity of the ABCD scales to a more established Big Five measure that does not explicitly contain balanced ABCD content. We chose the Maples, Guan, Carter, & Miller (2014) 120-item IPIP (International Personality Item Pool) NEO measure as a comparison because it contains a similar number of items and has desirable psychometric characteristics. The 120-item serves as an assessment tool for measuring the Big Five model utilizing item-response theory (IRT). It was constructed in response to a dearth of data demonstrating the convergence of the 300-item IPIP-NEO measure (Goldberg, 1999) with the revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992b) despite its free accessibility and modifiability to accommodate users' needs. The IRT-based IPIP-120 measure manifests good reliability, substantial convergence with the NEO PI-R as well as with Johnson's (2011) IPIP-J inventory, and strong criterion validity across two samples, suggesting that all three are promising assessment tools for the Big Five model. The mean alphas for internal consistency are $\alpha = 0.88$ for the domains and $\alpha = .78$ for the facets, respectively.

3.2.4.3. Affect Balance (PANAS_AB)

The 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was used to assess the distribution of positive and negative affect experience as two key dimensions of mood. The 20-item scale consist of words that describe various emotions and feelings (e.g., happy, distressed, scared), with 10 items for each affect schedule. Clients rated their affect experience on a 5-point Likert scale ranging from 1 for "very slightly" or "not at all" to 5 for "extremely" after each coaching session. Discriminant validity and internal reliability for positive affect ($\alpha = .89$) and negative affect ($\alpha = 0.86$) indicate very good psychometric properties with lengthier measures of these mood factors (Sirois & Hirsch, 2015). Affect balance (PANAS_AB) was calculated based on the method by Koydemir, Simsek, Schütz and Tipandjan (2013). The difference between positive and negative affect was quantified by adding 5 to the total to eliminate negative scores. High scores are indicative of positive affect balance.

3.2.4.4. Goal Attainment

The measures used to assess authentic self-development as goal attained after coaching are summarized in an overall score for GOAL and computed separately for each construct as GOAL dimension in this study. Likert-type anchors ranging from 1 = Strongly Disagree to 4 = Neutral, to 7 = Strongly Agree assessed 4 specific constructs: (1) Perceived Competence (e.g., "I feel confident in my ability to attain my goal.") related to the goal clients intended to pursue (4 items adapted from the scale created and first used by Williams & Deci (1996) with an alpha of .72 for internal consistency; internal consistency is similar to the values reported by Ryan, Williams, Patrick, & Deci (2009). (2) Goal-Commitment (e.g., "I Think this is a good goal to shoot for.") related to client's determination to reach a goal (5 items with a validated alpha of .72 for internal consistency (Klein et al., 2001); (3) Goal Self-Concordance (e.g., "I strive for this goal because I really believe it's an important goal to have.") related to the degree of autonomous or controlled reasons clients have for pursuing their goal (4 items have a consistently validated alpha ranging from .78 to .75 for internal consistency and reliability (Sheldon Houser-Marko, 2001); the scale

was created by Sheldon & Elliot (1998) and later refined by Sheldon and Houser-Marko (2001); (4) Goal Stability (e.g., "My interest in this goal did not change significantly over the past four weeks or so.") related to the extent to which client's aspirations, motivations and intentions evolved over the course of the study (3 items have a reliability alpha coefficient of .77 (Prywes, 2012); the scale was developed by Prywes (2012) based on Spence's (2008) work on the confounding effects of goal instability in goal setting research). Subscales computed for the present study (Table 3.2) show high correlations among themselves (r =.583 to .913).

Table 3.2.
Descriptive statistics, reliabilities for ABCDs of Big Five, Maples et al (2014) facets, PANAS, and GOAL values

	N	*Min*	*Max*	*M*	*SD*	*α*
ABCD Agreeableness - Affect	176	1.86	6.00	4.59	0.73	0.67
ABCD Agreeableness - Behavior	176	1.71	6.00	4.66	0.74	0.65
ABCD Agreeableness - Cognition	176	1.86	5.57	4.41	0.65	0.58
ABCD Agreeableness - Desire	176	2.00	6.00	4.89	0.61	0.53
ABCD Conscientiousness - Affect	176	2.00	5.14	3.60	0.68	0.46
ABCD Conscientiousness - Behavior	176	1.86	6.00	4.17	0.88	0.71
ABCD Conscientiousness - Cognition	176	2.00	6.00	4.74	0.65	0.60
ABCD Conscientiousness - Desire	176	1.71	6.00	4.30	0.85	0.78
ABCD Emotional stability - Affect	176	1.57	6.00	4.00	0.91	0.76
ABCD Emotional stability - Behavior	176	1.57	6.00	4.26	0.87	0.72
ABCD Emotional stability - Cognition	176	1.14	5.86	3.96	0.99	0.82
ABCD Emotional stability - Desire	176	1.57	5.71	3.51	0.91	0.77
ABCD Extraversion - Affect	176	1.43	6.00	4.26	0.87	0.76
ABCD Extraversion - Behavior	176	1.00	5.71	3.63	0.89	0.77
ABCD Extraversion - Cognition	176	2.00	5.14	3.82	0.64	0.50
ABCD Extraversion - Desire	176	1.71	5.57	3.87	0.77	0.69
ABCD Openness - Affect	176	1.57	6.00	4.88	0.76	0.68
ABCD Openness - Behavior	176	1.71	5.71	4.27	0.71	0.56
ABCD Openness - Cognition	176	1.57	6.00	4.68	0.91	0.87
ABCD Openness - Desire	176	1.00	6.00	4.71	0.86	0.85
ABCD Agreeableness - ABCD	176	2.04	5.89	4.64	0.54	0.79
ABCD Conscientiousness - ABCD	176	2.25	5.61	4.20	0.54	0.66
ABCD Emotional stability - ABCD	176	2.18	5.64	3.93	0.68	0.72
ABCD Extraversion - ABCD	176	2.25	5.32	3.90	0.61	0.76
ABCD Openness - ABCD	176	1.75	5.68	4.64	0.66	0.83
MAPL Neuroticism - ABCD	176	1.29	4.83	2.96	0.70	0.74
MAPL Extraversion - ABCD	176	1.50	5.75	4.20	0.75	0.80
MAPL Openness - ABCD	176	2.29	5.63	4.39	0.68	0.79
MAPL Agreeablness - ABCD	176	1.92	5.25	4.33	0.50	0.57
MAPL Conscientiousness - ABCD	176	1.92	6.00	4.48	0.64	0.80
MAPL Neuroticism Facet 1	176	1.00	6.00	3.39	1.17	0.78
MAPL Neuroticism Facet 2	176	1.00	6.00	3.20	1.15	0.85
MAPL Neuroticism Facet 3	176	1.00	6.00	2.74	1.06	0.59
MAPL Neuroticism Facet 4	176	1.00	6.00	2.73	0.95	0.66
MAPL Neuroticism Facet 5	176	1.00	6.00	3.03	1.04	0.23
MAPL Neuroticism Facet 6	176	1.00	5.50	2.68	0.95	0.75
MAPL Extraversion Facet 1	176	1.00	6.00	4.59	1.06	0.91
MAPL Extraversion Facet 2	176	1.00	6.00	3.53	1.33	0.85
MAPL Extraversion Facet 3	176	1.75	6.00	4.30	0.92	0.79
MAPL Extraversion Facet 4	176	1.00	6.00	4.24	1.03	0.78
MAPL Extraversion Facet 5	176	1.00	6.00	4.54	1.08	0.89
MAPL Extraversion Facet 6	176	1.00	6.00	4.03	0.90	0.12
MAPL Openness Facet 1	176	1.00	6.00	4.52	1.01	0.75
MAPL Openness Facet 2	176	1.00	6.00	4.58	1.01	0.72
MAPL Openness Facet 3	176	1.00	6.00	4.41	0.94	0.65
MAPL Openness Facet 4	176	1.00	6.00	4.09	0.90	0.57
MAPL Openness Facet 5	176	1.25	6.00	4.38	0.96	0.70
MAPL Openness Facet 6	176	1.50	6.00	4.34	1.04	0.53
MAPL Agreeablness Facet 1	176	1.00	6.00	4.24	0.93	0.64
MAPL Agreeablness Facet 2	176	1.75	6.00	4.33	0.79	0.47
MAPL Agreeablness Facet 3	176	1.00	6.00	5.03	0.93	0.83
MAPL Agreeablness Facet 4	176	1.00	6.00	5.03	0.85	0.66
MAPL Agreeablness Facet 5	176	1.00	5.25	2.95	0.97	0.64
MAPL Agreeablness Facet 6	176	2.25	6.00	4.40	0.82	0.56
MAPL Conscientiousness Facet 1	176	1.00	6.00	4.64	0.81	0.71
MAPL Conscientiousness Facet 2	176	1.25	6.00	4.33	0.96	0.64
MAPL Conscientiousness Facet 3	176	1.00	6.00	4.94	0.80	0.74
MAPL Conscientiousness Facet 4	176	1.75	6.00	4.91	0.82	0.70
MAPL Conscientiousness Facet 5	176	1.00	6.00	3.94	1.02	0.65
MAPL Conscientiousness Facet 6	176	1.00	6.00	4.13	0.98	0.75
PAN AffectBalance T1	176	-24	40	16.81	11.98	0.79
PAN AffectBalance T2	165	-25	40	19.07	12.67	0.72
PAN AffectBalance T3	157	-6	40	20.83	10.16	0.76
PAN AffectBalance T4	152	-13	39	20.68	12.16	0.75
PAN AffectBalance T5	145	-16	40	20.81	12.21	0.75
PAN AffectBalance T6	137	-9	40	22.51	11.30	0.80
PAN AffectBalance T7	115	-13	40	22.70	11.91	0.76
PAN AffectBalance T8	92	-18	40	22.33	11.82	0.73
PAN AffectBalance T9	73	-20	40	23.42	13.24	0.69
PAN AffectBalance T10	61	-10	40	23.85	11.01	0.75
GOAL perceived competence	176	2.58	7.00	5.96	0.89	0.91
GOAL goal commitment	176	1.60	7.00	5.87	0.97	0.81
GOAL self-concordance	176	2.50	7.00	5.55	1.02	0.62
GOAL goal stability	176	1.00	7.00	3.99	1.34	0.58

Note. Sample size (*N*), Means (*M*), standard deviations (*SD*), minimum (*Min*) and maximum (*Max*) ratings per variable across the sample size, and Cronbach's alpha (*α*) as a measure of reliability. Ratings range for ABCD scales from 1 to 6, for MAPLES scales from 1 to 6, for AffectBalance from -40 to 40, for GOAL values from 1 to 7. ABCD denotes cumulative descriptive values for the Big Five components per trait dimension. MAPL indicates descriptives for the Maples et al (2014) personality dimensions obtained from clients prior to coaching. The numbers 1 to 6 indicate the range of facets. T1 to T10 indicates the number of sessions as measurement points for the PAN (PANAS) AffectBalance measures. GOAL indicates the Goal Attainment Scales measures used for assessing clients' authentic self-development in their goal attainment.

3.3 Statistical analysis

As the ABCD and GOAL dimensions were measured once and PANAS dimensions were measured after each coaching session, the data consists of singular and repeated measurements. The data sample for the study was gathered from 176 coach-client dyads and the 1.627 self-reported questionnaires the client answered.

3.3.1 Data Structure and Model

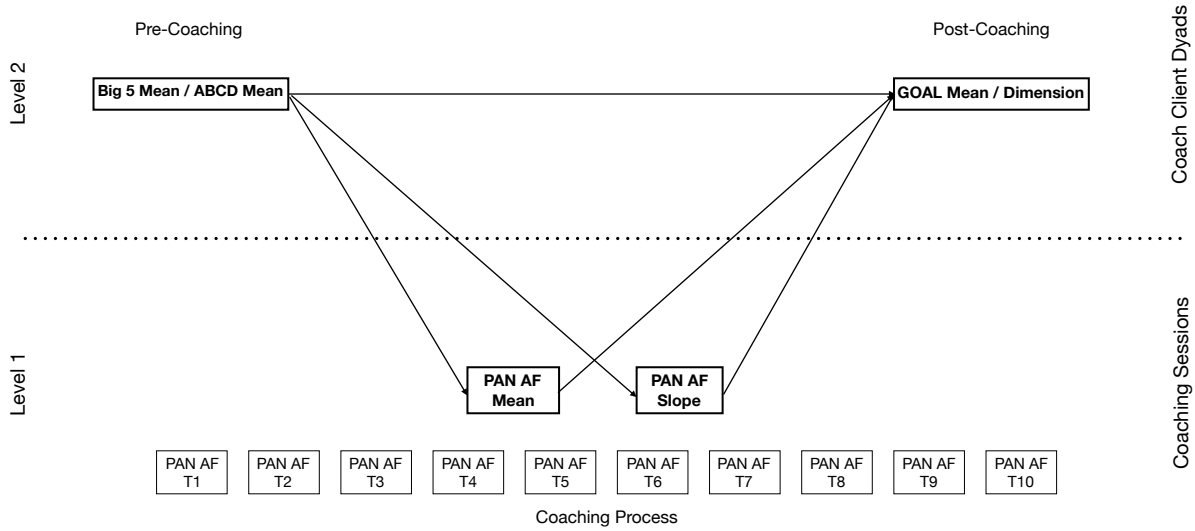
Based on the research design and arrangement of measurements the resulting data sample contains nested and clustered information. The dataset consists of individual coach-client dyad data which contain the pre and post coaching measures as well as the sequential repeated post-coaching session measures. Additionally, coach-client dyads can be clustered according to the number of coaching sessions completed. A simple mediation model or linear growth model was considered for analysis but deemed unfit to answer the line of hypothesis, due to the structure of the research data. A multilevel mediation model was chosen instead as for clustered data multilevel modeling (MLM) has shown better models than multiple linear regressions (Kreft & de Leeuw, 1998; Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). MLM also enables to account for the interactions on an individual coach-client dyad level as well as the differences between the coach-client dyads in one model.

3.3.2 Multilevel Model

Data analysis was performed in the statistical modeling software Mplus version 8.4, as the multilevel structural equation modeling (MSEM) frameworks implemented in the software program are able to model mediation pathways with Level 2 outcomes (Preacher, Zyphur, & Zhang, 2010). The different dyads (N=176) were identified as one level which contains the individual sessions (T1 to T10) as a different level nested within. Thus, a two-level model was

chosen based on the identified levels, with the dyads as Level 2 and repeated sessions as Level 1. The Level 2 variables were the mean Big Five trait dimensions and mean ABCD components as independent variable and the mean Goal Attainment Score (GOAL_MN) as continuous dependent variable. As the independent and dependent variables were mediated by the per session Affect Balance Score (PAN Affect Balance) Level 1 mediator, a 2-1-2 mediation model (Preacher et al., 2010) was chosen for the analysis. The linear growth approach of the model allows for accommodation of the PAN_AF time component as the mean equals the baseline state of all clients, and the slope shows the rate of change over time. In other words, the impact of personality on authentic self-development was investigated through the dynamic development of affective self-regulation as indicated by the slope of affect balance across sessions. Anticipated variance in the participating dyads and level of change for the series of sessions necessitated the utilization of random slope as process variables in the model. Opting for random slopes allows the individual slopes to differ for each coach client pairs, modeling the different effect for each pair. The MSEM framework in Mplus enables the modeling of random intercepts and slopes within the data cluster. The model analysis setting maximum likelihood estimation was used in all models, as it can account for missing data, unbalanced cluster sizes, and random slopes. The modeling program analysis is based on the data sample and the interpolated most probable estimate, based on the data sample and model structure. Figure 3.2 depicts the basic analytical overview of the 2-1-2 mediation model.

Figure 3.2: Basic analytical overview of 2-1-2 mediation model



Note. Basic analytical 2-1-2 path model reflecting interactions between personality traits as a mean measure (Big 5 Mean comprising Agreeableness, Conscientiousness, Emotional Stability, Extraversion, Openness) representing the balanced ABCDs as a mean (comprising Affect, Behavior, Cognition, Desire) prior to the commencement of the coaching engagement, affect balance (PAN AF) measured within 24 hours after each coaching session over time (PAN AF T1 … T10), the mean level of PAN AF over time (T1 … T10), the slope of state PAN AF over time (T1 … T10), authentic self-development as a goal mean (GOAL Mean) and measures for the dimensions Perceived Competence, Goal Commitment, Goal Self-Concordance, Goal Stability three months after the coaching engagement was completed. Big 5 Mean and GOAL Mean form Level 2 variables assess coach-client dyads, and PAN AF M (T1 … T10) mean and PAN AF Slope form Level 1 variables in the 2-1-2 model assess client session self-reports.

3.3.3 Iterating the 2-1-2 Mediation Model

As the research design called for a detailed analysis of the different Big Five trait dimensions and their ABCD components, a separate model was computed for each dimension and ABCD component scores as independent variable. When using random slopes, there is no single population covariance matrix to assess the model fit (Muthén & Asparouhov, 2011). The 29 computed models showed perfect model fit as they were completely saturated. In iterating on the 2-1-2 mediation models, the GOAL dimensions of Perceived Competence, Goal Commitment, Goal Self-concordance and Goal Stability were used instead of the mean Goal Attainment Score resulting in a total of 145 models for the ABCD components. The previous steps were repeated for the Maples trait domains as composites and related facets (MAPL components), resulting in an additional 175 models.

Parameters of interest in all path models were estimated by standardized regression coefficients. These included direct effects relating (a) trait dimensions and components to goal dimensions, (b) trait dimensions (and components) to mean affect balance (c), trait dimensions (and components) to the slope of affect balance, (d) mean affect balance to goal dimensions, and

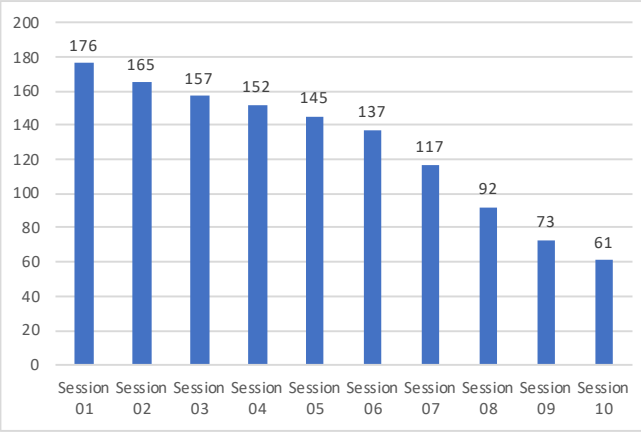
(e) the slope of affect balance to goal dimensions. Two indirect effects were computed relating (a) the path from trait dimensions (and components) to goal dimensions via mean affect balance and (b) the path from trait dimensions (and components) to goal dimensions via the slope of affect balance.

3.4 Results

3.4.1. Descriptive Statistics and Reliabilities

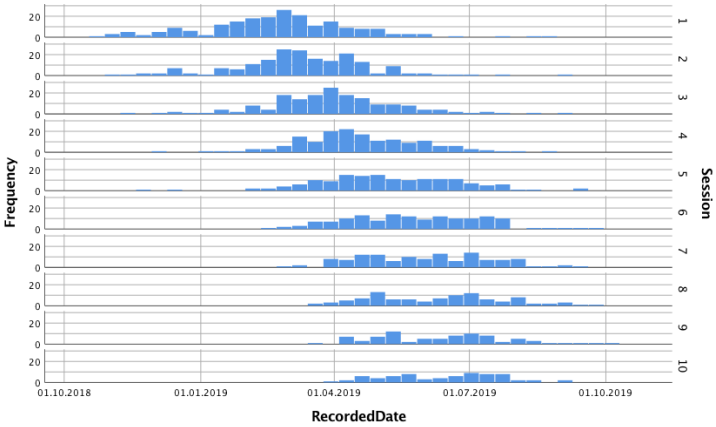
The values for descriptive statistics and reliabilities were calculated using SPSS version 25. For sub-scale details see Table 3.2. The personality and goal attainment measures had no missing data. In contrast, affect balance showed an increasing amount of missing data after the first coaching session, which was due to variance in the number of sessions the coaches had with their clients rather than the result of any missing questionnaire data. As the multilevel analysis incorporates individual coach-client dyads and their number of coaching sessions on different levels, the completed session data impacts the model based on the ML estimator. The number of sessions completed by coach-client dyads (Figure 3.3) and as distributed in the data collection phase over 12 months (Figure 3.4) was as follows: session no. 1 (*N*=176), session no. 2 (*N*=165), session no. 3 (*N*=157), session no. 4 (*N*=152), session no. 5 (*N*=137), session no. 6 (*N*=137), session no. 7 (*N*=117), session no. 8 (*N*=92), session no. 9 (*N*=73), and session no. 10 (*N*=61). The coach-client-pairs (*N*=176) had at least one session, 93.75% (*N*=165) had a second session and 34.66% (*N*=61) had the maximum number of ten sessions observed for this study. The recorded timespan between post-session questionnaires was on average 16 days, 3 hours and 29 minutes. Figure 3.5 depicts average timespans between sessions by dyads. There were no missing sessions. The number and distribution of dyadic interactions of the convenience sample reflect the framework of the naturalistic setting of coaching engagements.

Figure 3.3.
Frequency distribution of sessions in the data collection phase



Note. Data collection phase lasted from October 2018 through to October 2019. 176 coach-client pairs engaged in 1 session; 61 coach-client pairs engaged in 10 sessions.

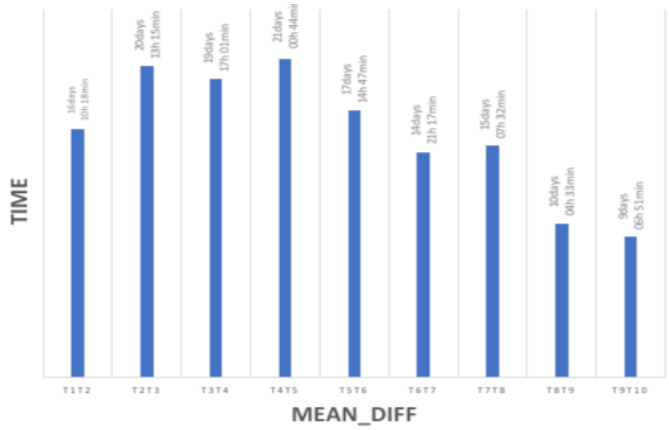
Figure 3.4.
Periodic distribution of coaching sessions in the data collection phase



Note. Histogram depicts the perodic distribution of coaching sessions in the period between October 2018 and October 2019.

Figure 3.5.

Frequency distribution of session completion by dyads



Note. MEAN_DIFF depicts the average timespan between sessions T1T2, T2T3 … . TIME indicates the amount of days, hours and minutes of the timespan between sessions.

The ABCD composite mean value ranges from $M = 3.50$ to $M = 4.88$ with the standard deviation value ranging from $SD = 0.61$ to $SD = 0.99$. The Maples composites mean value ranges from $M = 2.67$ to $M = 5.03$ with the standard deviation value ranging from $SD = 0.78$ to $SD = 1.32$. The Affect Balance mean value ranges from $M = 16.81$ to $M = 2.85$ with the standard deviation value ranging from $SD = 10.16$ to $SD = 13.24$.

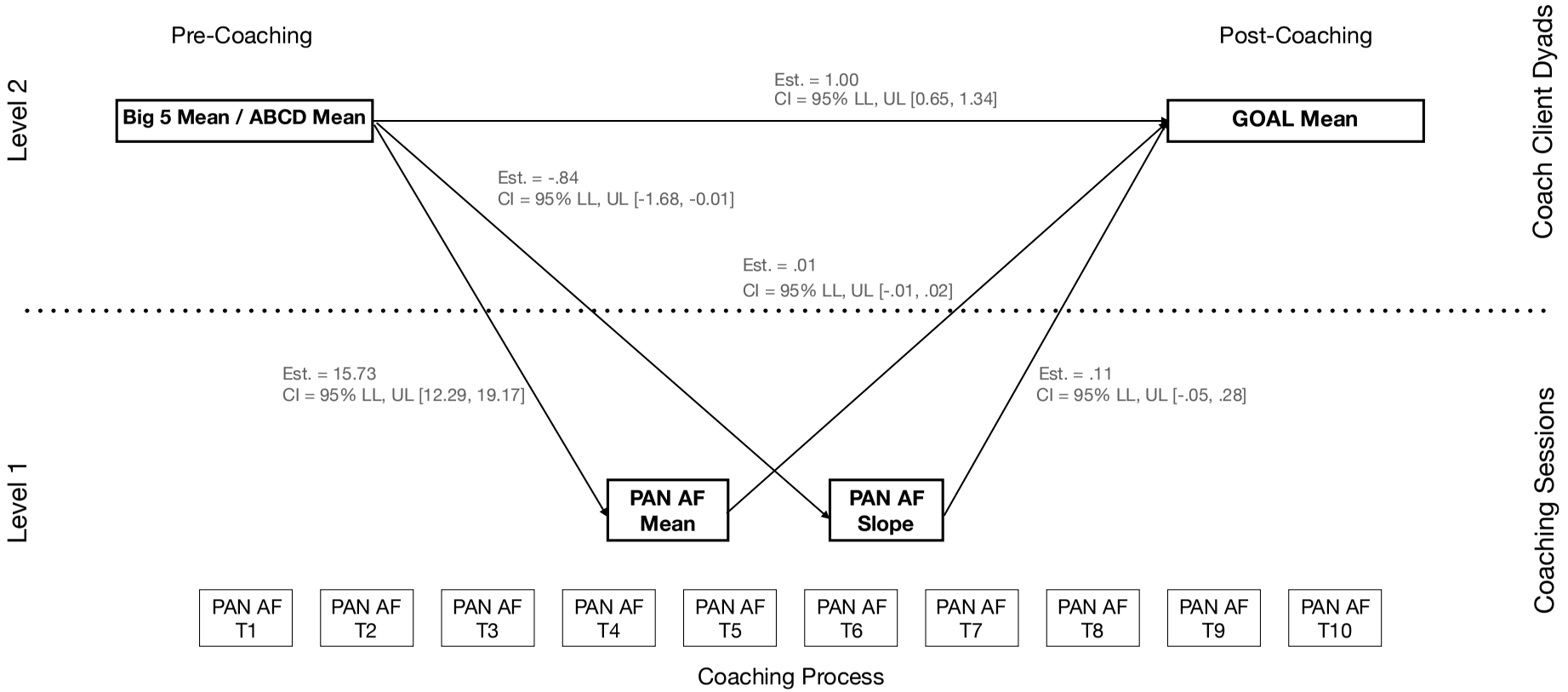
Cronbach's Alpha for all dimensions and components/composites of the measures were calculated. Cronbach's Alpha for the ABCDs are as follows: Agreeableness $\alpha = 0.79$, Conscientiousness $\alpha = 0.66$, Emotional Stability $\alpha = 0.72$, Extraversion $\alpha = 0.76$ and Openness $\alpha = 0.83$. For MAPLES the Cronbach's Alpha are $\alpha = 0.74$ for Neuroticism, $\alpha = 0.80$ for Extraversion, $\alpha = 0.78$ for Openness to experience, $\alpha = 0.57$ for Agreeableness, and $\alpha = 0.80$ for Conscientiousness. The PANAS Cronbach's Alpha per session ranges from $\alpha = 0.69$ to $\alpha = 0.80$. The Cronbach's Alpha for Goal Attainment dimensions are $\alpha = 0.91$ for perceived competence, $\alpha = 0.82$ for goal commitment, $\alpha = 0.62$ for goal self-concordance, and $\alpha = 0.58$ for goal stability. The measures used in this study show a moderate to good degrees of reliability.

3.4.2. Multilevel Path Models

Figure 3.6 provides a synopsis of the initial 2-1-2 mediation model based on the mean values of Big Five traits, GOAL dimensions and affect balance indicating the regression coefficients and confidence intervals for each relationship. Figure 3.7[3] depicts the iterations in the multilevel path model based on the mean values of each Big Five personality trait including the ABCD components, GOAL dimensions, and affect balance indicating the regression coefficients and confidence intervals for each relationship.

[3] Appendix Figure 3.7. Iterated 2-1-2 mediation model: GOAL Mean per B5 / ABCD Composite

Figure 3.6. Main mean effects of the 2-1-2 mediation model



Note. The basic 2-1-2 path model indicating mean model results as regression coefficients (Est.) and confidence intervals (CI). Estimates indicate the regressed coefficient of the relationship between two variables based on the observed data, respectively. Values in square brackets indicate the 95% confidence interval for each correlation The confidence interval is a plausible range of population correlations that could have caused the sample correlations (Cumming, 2014) and the affect correlations that could have mediated the goal correlations. LL and UL indicate the lower and upper limits of a confidence interval, respectively. The associated *p*-values for all multilevel paths models computed in this study are shown in Table 3a, 3b and Table 4a and 4b, respectively.

The complete path model results for Big Five traits and ABCD dimensions per GOAL dimension are included in Table 3.3a[4]. For comparison, the complete path model results for MAPL personality dimensions per GOAL dimension are shown in Table 3.3b[5]. These two tables indicate regression coefficients and *p*-values as key values for significant direct and indirect effects obtained from each multilevel path model.

Across trait measures, indirect effects including slope of affect balance as a mediator were not significant across the goal composite and individual goal dimensions. Results show no significant between-person variation. As a result, slopes do not relate to other variables across trait measures. However, results indicate that the within-person residual variance for affect balance is always significant, which suggests a substantial within-person variation across trait measures.

In contrast, many indirect effects from traits and components to goal attainment scales through the mean of affect balance were significant and are shown in Table 3.4a for the Big Five traits and ABCDs. There is between-person variation in affect balance, which is shown in the standard deviation values of affect balance to quantify between-person variation in affect balance (Table 3.2). For comparison, Table 3.4b depicts the indirect effects for the MAPL personality dimensions and facets in the same way. Specifically, indirect effects including mean of affect balance as a mediator were largely significant for the goal composite and goal dimensions of perceived competence and goal commitment, but not for goal self-concordance or goal stability. For all effects, more socially desirable poles of traits (e.g., agreeableness, conscientiousness, emotional stability) predicted higher levels of goal attainment through more positive affect balance means.

[4] Appendix Table 3.4a. Indirect effects and P-values from Multilevel Path Models including Mean Affect Balance as a Mediator - Big Five on GOAL

[5] Appendix Table 3.4b. Indirect effects and P-values from Multilevel Path Models including Mean Affect Balance as a Mediator - Maples on GOAL

Table 3.4a.

Indirect Effects and p-Values from Multilevel Path Models Including Mean Affect Balance as a Mediator - Big Five on GOAL

Variable	GOAL composite		Perceived competence		Goal commitment		Goal self-concordance		Goal stability	
	Est.	*p*	*Est.*	*p*	*Est.*	*p*	*Est.*	*p*	*Est.*	*p*
Agreeableness ABCD Composite	0.11	0.02	0.28	0.00	0.17	0.02	0.06	0.39	-0.05	0.60
Agreeableness Affect	0.08	0.04	0.16	0.01	0.11	0.03	0.07	0.13	-0.02	0.72
Agreeableness Behavior	0.08	0.02	0.19	0.00	0.11	0.02	0.06	0.21	-0.03	0.61
Agreeableness Cognition	0.09	0.03	0.19	0.01	0.13	0.03	0.07	0.18	-0.02	0.76
Agreeableness Desire	0.09	0.02	0.21	0.00	0.13	0.02	0.06	0.26	-0.04	0.64
Conscientiousness ABCD Composite	0.13	0.01	0.27	0.00	0.19	0.01	0.13	0.07	-0.07	0.45
Conscientiousness Affect	0.00	0.94	-0.01	0.92	0.00	0.94	0.00	0.94	0.00	0.94
Conscientiousness Behavior	0.07	0.01	0.14	0.00	0.10	0.01	0.07	0.07	-0.02	0.57
Conscientiousness Cognition	0.12	0.04	0.28	0.00	0.18	0.01	0.08	0.36	-0.07	0.55
Conscientiousness Desire	0.06	0.05	0.12	0.03	0.08	0.04	0.06	0.11	-0.02	0.64
Emotional Stability ABCD Composite	0.11	0.03	0.24	0.00	0.17	0.01	0.09	0.21	-0.05	0.57
Emotional Stability Affect	0.08	0.02	0.15	0.00	0.12	0.01	0.08	0.07	-0.02	0.74
Emotional Stability Behavior	0.05	0.04	0.11	0.02	0.07	0.05	0.05	0.12	-0.02	0.57
Emotional Stability Cognition	0.08	0.02	0.15	0.00	0.12	0.01	0.07	0.18	-0.03	0.67
Emotional Stability Desire	0.07	0.01	0.13	0.00	0.09	0.01	0.06	0.07	-0.01	0.84
Extraversion ABCD Composite	0.09	0.06	0.19	0.03	0.14	0.05	0.08	0.17	-0.02	0.71
Extraversion Affect	0.08	0.04	0.15	0.02	0.11	0.04	0.05	0.20	-0.02	0.77
Extraversion Behavior	0.01	0.65	0.02	0.62	0.02	0.64	0.01	0.66	0.00	0.83
Extraversion Cognition	0.08	0.05	0.15	0.02	0.11	0.05	0.07	0.14	-0.02	0.74
Extraversion Desire	0.07	0.05	0.14	0.02	0.11	0.04	0.07	0.13	-0.03	0.54
Openness ABCD Composite	0.09	0.03	0.23	0.00	0.14	0.02	0.06	0.37	-0.06	0.50
Openness Affect	0.09	0.02	0.20	0.00	0.14	0.01	0.05	0.26	-0.04	0.53
Openness Behavior	0.10	0.02	0.20	0.01	0.13	0.02	0.08	0.11	-0.02	0.72
Openness Cognition	0.06	0.03	0.13	0.01	0.09	0.02	0.05	0.16	-0.03	0.57
Openness Desire	0.07	0.02	0.17	0.00	0.11	0.01	0.05	0.24	-0.03	0.59

Note. 2-1-2 mediation model output estimate (Ext.) and two-tailed p-value (p) for Goal Attainment (GOAL) on Big Five trait facets and domains. Slope referes to grow slope of Affect Balance per session. Indirect effects between slope of mediator on Big Five trait and slope of GOAL on slope of mediator (indb) and indirect effects between slope of Affect Balance on Big Five trait and slope of GOAL on Affect Balance (indd).

Table 3.4b.

Indirect Effects and p-Values from Multilevel Path Models Including Mean Affect Balance as a Mediator - Maples on GOAL

Variable	GOAL composite		Perceived competence		Goal commitment		Goal self-concordance		Goal stability	
	Est.	*p*	*Est.*	*p*	*Est.*	*p*	*Est.*	*p*	*Est.*	*p*
Agreeableness Composite	0.13	0.02	0.28	0.00	0.18	0.03	0.07	0.33	-0.03	0.78
Agreeableness Facet 1	0.04	0.15	0.08	0.13	0.06	0.16	0.04	0.22	-0.01	0.79
Agreeableness Facet 2	0.06	0.05	0.12	0.03	0.08	0.07	0.05	0.16	0.00	0.92
Agreeableness Facet 3	0.07	0.02	0.16	0.00	0.11	0.02	0.05	0.31	-0.02	0.69
Agreeableness Facet 4	0.08	0.02	0.16	0.00	0.11	0.03	0.06	0.21	-0.01	0.88
Agreeableness Facet 5	-0.03	0.16	-0.06	0.17	-0.04	0.16	-0.03	0.19	0.01	0.79
Agreeableness Facet 6	0.07	0.04	0.15	0.02	0.10	0.03	0.06	0.14	-0.02	0.61
Conscientiousness Composite	0.07	0.27	0.24	0.01	0.15	0.13	0.03	0.78	-0.12	0.35
Conscientiousness Facet 1	0.07	0.10	0.17	0.00	0.11	0.06	0.04	0.48	-0.06	0.51
Conscientiousness Facet 2	0.07	0.01	0.15	0.00	0.11	0.01	0.06	0.10	-0.04	0.47
Conscientiousness Facet 3	0.11	0.02	0.21	0.00	0.16	0.01	0.06	0.37	000	0.97
Conscientiousness Facet 4	0.07	0.05	0.19	0.00	0.10	0.05	0.07	0.22	-0.06	0.39
Conscientiousness Facet 5	0.07	0.03	0.14	0.00	0.10	0.03	0.23	0.00	-0.02	0.71
Conscientiousness Facet 6	0.07	0.01	0.14	0.00	0.10	0.01	0.07	0.06	-0.02	0.61
Neuroticism Composite	-0.11	0.03	-0.22	0.00	-0.17	0.01	-0.09	0.21	0.07	0.47
Neuorticism Facet 1	-0.05	0.01	-0.09	0.00	-0.07	0.01	-0.05	0.04	0.02	0.65
Neuroticism Facet 2	-0.02	0.34	-0.03	0.35	-0.03	0.35	-0.02	0.38	0.00	0.76
Neuorticism Facet 3	-0.08	0.02	-0.15	0.00	-0.11	0.01	-0.05	0.27	0.01	0.87
Neuroticism Facet 4	-0.10	0.01	-0.19	0.00	-0.14	0.01	-0.08	0.12	0.02	0.79
Neuroticism Facet 5	-0.03	0.15	-0.05	0.14	-0.04	0.18	-0.03	0.21	0.01	0.72
Neuroticism Facet 6	-0.07	0.04	-0.14	0.00	-0.12	0.01	-0.08	0.11	0.06	0.36
Extraversion Composite	0.10	0.03	0.21	0.00	0.16	0.02	0.07	0.25	-0.06	0.44
Extraversion Facet 1	0.07	0.02	0.14	0.01	0.11	0.02	0.05	0.17	-0.02	0.72
Extraversion Facet 2	0.02	0.37	0.03	0.35	0.02	0.37	0.01	0.41	0.00	0.76
Extraversion Facet 3	0.07	0.04	0.13	0.01	0.11	0.03	0.06	0.14	-0.03	0.52
Extraversion Facet 4	0.07	0.03	0.13	0.01	0.10	0.02	0.06	0.12	-0.02	0.71
Extraversion Facet 5	0.06	0.04	0.12	0.02	0.09	0.03	0.04	0.18	-0.03	0.51
Extraversion Facet 6	0.09	0.02	0.21	0.00	0.14	0.01	0.08	0.15	-0.07	0.34
Openness Composite	0.06	0.05	0.11	0.02	0.08	0.05	0.05	0.14	-0.01	0.80
Openness Facet 1	0.04	0.10	0.07	0.09	0.05	0.10	0.03	0.16	-0.01	0.72
Openness Facet 2	0.06	0.05	0.11	0.02	0.08	0.05	0.05	0.14	-0.01	0.80
Openness Facet 3	0.01	0.66	0.02	0.63	0.02	0.66	0.01	0.66	0.00	0.84
Openness Facet 4	0.05	0.07	0.10	0.05	0.08	0.07	0.04	0.15	-0.01	0.87
Openness Facet 5	0.05	0.08	0.09	0.07	0.06	0.08	0.04	0.15	0.00	0.88
Openness Facet 6	0.01	0.68	0.02	0.67	0.01	0.68	0.01	0.67	0.00	0.84

Note. 2-1-2 mediation model output estimate (Ext.) and two-tailed p-value (p) for Goal Attainment (GOAL) on Big Five trait facets and domains. Slope referes to grow slope of Affect Balance per session. Indirect effects between slope of mediator on Big Five trait and slope of GOAL on slope of mediator (indb) and indirect effects between slope of Affect Balance on Big Five trait and slope of GOAL on Affect Balance (indd).

There were some nuances in the indirect effects results across trait measures. Of the 25 indirect effects relating the goal composite to ABCD scales through the slope of affect balance, 22 were significant. Similar patterns of results were obtained for the goal dimensions of perceived competence (23/25) and goal commitment (22/25). For the Maples scale, proportions of significant indirect effects were as follows: goal composite (21/35), perceived competence (27/35), and goal commitment (20/35). Table 3.5 depicts the absolute values of indirect effect sizes relating personality characteristics to perceived competence and goal commitment as the aspects of authentic self-development with the most important effects and as they are mediated by mean affect balance. The table shows the number of indirect effects within certain ranges (.00-.10, .11-.20, .21-.30, > .30) for each measure, separated by traits and facets. Specifically,

trait composites show significant predicting effects while the ABCDs have moderate predicting effects. There were more ABCD scale facets (20) than traits (5). Therefore, the number of effects is expected to be higher among facets. The percentage of effects and size of effects is larger among traits, which is consistent. The Maples et al (2014) facets show relatively inconsistent predicting effects.

Table 3.5.

Absolute Values of Indirect Effect Sizes Relating Personality to Perceived Competence and Goal Commitment via Mean Affect Balance

Scale	Absolute Value of Indirect Effect Size					
	Perceived competence			Goal commitment		
	.00 - .10	.11 - .20	.21 - .30	.00 - .10	.11 - .20	.21 - .30
ABCD Scale Composite Traits	0	1	4	0	5	0
ABCD Scale Facets	2	16	2	7	13	0
Maples Scale Composite Traits	0	1	4	0	1	4
Maples Scale Facets	11	17	2	19	11	0

Note. Numbers indicate how many indirect effect sizes fall within the specified effect size range.

The indirect effects predicting self-concordance and goal stability via the mean effects of affect balance were not significant. Although many direct effects linking traits and facets (for both the Big Five scales and Maples scales) to self-concordance were significant, the direct effects from mean affect balance to self-concordance were not significant. Finally, the direct effects predicting goal stability from personality traits and mean affect balance were not significant.

3.5 Discussion

The purpose of this paper is in line with scholarly initiatives in coaching research (Grant, 2012) to account for the aspect of client's sustained well-being and authentic self-development as the "over-arching goal of the coaching enterprise" (Grant, 2012, p. 161). As such, coaching is proposed to be the means through which clients attain authentic self-development and reach enduring goals that are self-concordant and aligned with their needs and values (Sheldon & Elliot, 1998). This proposition concurs with findings in a recent large-scale near-randomized controlled

trial study in a healthcare corporation involving 180 clients, 66 coaches and 140 client line-managers (de Haan et al., 2019). That study investigated the impact of coaching as an appropriate intervention to make sense and change leadership-derailment patterns (Nelson & Hogan, 2009) before and after coaching. While findings showed weak associations between Big Five personality traits and executive coaching effectiveness, they indicated that executive coaching has a small but significant soothing, balancing and responsibility-enhancing causal impact on client personality as the measure stretched over two time points in that study. It indicates that coaching is likely to play a role in preventing leadership derailment, which concurs with our interpretation of findings in our study that coaching per se represents a self-regulatory intervention, in which client's affect balance has a mediating role between personality and authentic self-development. Therefore, we propose that coaching as a contextual factor influences how personality can contribute to client's effectiveness across sessions and over time.

The present study produced a whole range of significant findings picking up differential effects beyond common method variance (CMV; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Generally, we argue that these findings are due to the considerably large size of our sample as well as the specific approach we applied to look into personality as a predictor in coaching as a change process. Specifically, we argue that there are several characteristics of the findings that are not consistent with common method variance. First, there were many non-significant associations between variables assessed with the same method, which would not be expected if common method variance were a strong contributor to the findings (Lindell & Whitney, 2001). Second, in the multi-level path analyses, there were several unique associations between (a) traits and measures of authentic self-development controlling for affect balance, and (b) between affect and measures of authentic self-development controlling for traits. It is unlikely that those unique associations would be so prevalent if method variance were a strong contributor to findings. Third, separation of assessment in time (measurement of traits at T1; affect balance measured repeatedly across coaching sessions; and authentic self-development measured three months after the

completion of the coaching engagement) as a methodical approach helps alleviate concerns about common method variance accounting for inflated associations between variables. We address the issue of common method variance in the limitations section below.

The following sections discuss the differentiated findings in greater detail.

3.5.1. Role of personality & affect balance in authentic self-development

First, we hypothesized that the ABCDs (e.g., emotionally stable affect, conscientious behavior) rather than the domain-level traits (e.g., emotional stability, conscientiousness) of the Big Five traits (Wilt & Revelle, 2015) would facilitate authentic self-development through the change process in coaching. Yet, findings in the present study do not support the hypothesis that ABCDs are more likely to tease apart which personality characteristics are associated with client's authentic self-development in coaching. On the contrary, findings showed that both the higher domain level traits of Agreeableness, Conscientiousness, Emotional Stability, Extraversion, and Openness as well as the psychological components of these traits (i.e., ABCD) predict certain aspects of authentic self-development (i.e., higher self-reported levels of perceived competence, goal commitment, goal self-concordance). While both personality traits and ABCDs predicted certain aspects of authentic self-development via affect balance, trait measures had moderate effect sizes whereas ABCDs tended to have small effect sizes. This may be attributable to the fact that the trait inventory utilized for this study shows a balanced representation of the ABCDs and thus covers the conceptual content of traits more completely (Pytlik Zillig et al., 2002; Wilt & Revelle, 2015). Indeed, the Big Five measure including balanced ABCD content across traits predicted authentic self-development through mean affect balance more consistently than a traditional measure of personality traits (Maples et al., 2014) that does not explicitly delineate traits according to ABCD content. The consistency of prediction of balanced ABCD content across traits in the present study may also explain why de Haan et al (2019) purport that although

we can confirm associations between client personality and coaching outcome for some commonly personality traits (Stewart et al., 2008; de Haan et al., 2019), previous findings tended to be small in size and inconsistent across studies and over all times rendering their interpretation difficult. We claim that the present study can amend this issue by providing a first avenue for interpretation through differential findings.

Furthermore, while Stewart et al (2008) found that conscientiousness, emotional stability, and openness to experience as assessed by the 10-item subscale of the International Personality Item Pool (IPIP; Goldberg, 1999) were positively related to the application aspect of coaching transfer, they did not find this positive relationship between these same personality traits and the generalization and maintenance aspect of coaching transfer (Stewart, 2006). Stewart et al (2008) argue that generalization and maintenance situations do not provide sufficient novelty to motivate individuals to transfer learning in a more general and sustained manner, although in an earlier study Stewart (2006) proposed that personality may impact on coaching success in how other variables (i.e., work environment, client, coaching) may strengthen or weaken the relationship between personality and coaching success. In contrast, we found a more generalizable learning transfer in how clients reported authentic self-development three months after their coaching engagement was completed. We speculate that, as trait domains all share a common set of defining characteristics (i.e., ABCDs) with relatively equal saturations of ABCD content, they are likely to have higher predictive power grouped in the same class than ABCDs assessed separately. This compounded predictive effect of the A, B, C, and D domains jointly explaining authentic self-development is not surprising. As personality taxonomies tend to focus on one domain (i.e., behavior) more specifically than on others (i.e., emotion, cognition, and desire) in how they represent traits, trait domains are applied inconsistently (Wilt & Revelle, 2015). However, as personality trait psychology seeks to understand variation in how individuals feel, think, act, and in what they want (Revelle, 2008), operationalizing the four domains through a balanced representation of these domains in all five personality traits is necessary to reflect that each

domain is equally incorporated in each personality trait. For instance, if the personality trait of neuroticism is assessed with items reflecting predominantly affective content, researchers may miss to understand the processes by which neuroticism as a trait is related to the outcomes that it is expected to assess. In other words, the way neurotic individuals feel does not explain how those individuals think, what they do, and what they desire unless the personality trait of neuroticism reflects the other three trait domains.

Moreover, we claim that as personality was measured as mediated by affect balance, findings reflect what Stewart et al (2008) posited that there are other variables that need to be explored in association with personality when it comes to measuring coaching success to arrive at a more nuanced understanding of the role of personality in coaching as a performance development intervention.

Second, findings in the present study indicated that client's personality may help or hinder their authentic self-development as personality characteristics are found to predict client's goal-self concordance but not goal stability on completion of the coaching engagement. This differentiation concurs with theoretical propositions by Clutterbuck and Spence (2017) that goals need to be viewed in a more systemic manner (Pryor & Bright, 2011) as they form a part of client's more complex context (e.g., current concerns, general life tasks, personal projects and strivings as dimensions of goal; level of difficulty of a goal as it challenges clients mentally, emotionally and physically; level of abstraction and specificity of goals) and therefore need to be considered as "temporary responses to a set of needs" (Clutterbuck & Spence, 2017, p. 218) requiring clients to be flexible to adapt internal and external changes (Tomaschek & Pärsch, 2006) as a result of making adequate sense of their internal and external contexts. In line with self-determination theory (Deci & Ryan, 1985, 2000) and based on current understanding of goal theories in coaching (Clutterbuck & Spence, 2017), we propose that the lack of causal association between personality and goal stability calls us to further investigate the extent to which clients are motivated to pursue goals for autonomous reasons (i.e., core values and evolving interests) in concordance with

client's congruent self in world that is complex and messy (Boyatzis & Howard, 2013) that cannot be researched in laboratory settings, an indication which is sufficiently corroborated in the present study. Elsewhere, the findings on the role of goal stability investigated in major theories of developmental regulation are inconclusive (Martinent et al., 2017). Such theories including the motivational theory of life-span development (Heckhausen, Wrosch, & Schulz, 2010), the model of selection, optimization, and compensation (Freund & Baltes, 1998), or the dual-process model of assimilative and accommodative coping (Brandtstädter & Rothermund, 2002) emphasize that stability in terms of maintaining a sense of control over developmental processes is important for healthy psychological functioning. For instance, the dual-process model of assimilative and accommodative coping purports that the older individuals grow, the more they shift from pursuing goals tenaciously to pursing goals flexibly modifying goals or disengaging from goals, if necessary. While our study did not look into age-related shifts of goal stability in authentic self-development, the theories of developmental regulation imply that goal stability may indicate low flexible coping and that goal instability may indicate high flexible coping in terms of adaptive self-regulation. Although a tenacious goal pursuit in terms of goal stability may contribute to overcoming feelings of helplessness and to regaining a sense of efficacy even at the expense of causing some loss (Brandtstädter & Rothermund, 2002), we argue that flexible goal adjustment (FGA) in terms of goal instability may contribute to higher effectiveness in attaining authentic self-development in coaching. Maybe investigating individual differences in coping strategy in response to challenging moments of change in coaching is a way to gain deeper understanding about the role of goal stability in goal attainment in coaching. We propose future research to look into flexible goal adjustment (FGA) and tenacious goal pursuit (TGR) as the two key avenues of the dual-process framework to advance coaching knowledge about the mechanisms of client personality, individual coping strategy for adaptive self-regulation and goal attainment in the future.

Third, while higher levels of average affect balance rather than the change in affect balance are indicated to explain the direct relationship between personality characteristics and two aspects of authentic self-development (perceived competence and goal commitment), affect balance did not mediate associations between personality and self-concordance or goal stability. We argue that this can be tentatively explained by how coaching as a contextual factor has the capacity to balance client's positive and negative affect towards working flexibly on goals that can be treated as a process as goals loop through cycles of goal establishment or goal revision to goal development (e.g., Bandura, 1986, Frese & Zapf, 1994). Generally, this perspective recognizes that goals and goal properties can change and are thus unstable throughout their tenure as they are influenced by various factors (e.g., environment, personality, acting on goals impacts on other goals, resource depletion through fatigue influences goal striving). Therefore, linear models encounter issues accounting for the treatment of goals as a dynamic process (Levine & Fitzgerald, 1992). For our findings, this perspective implies that it is not 'more affect balance' that will support clients in attaining sustained self-development authentically but 'how coaching provides a consistent platform' for clients to adapt to changing needs in their internal and external worlds. Moreover, we argue that the lack of mediated associations between personality and self-concordance or goal stability calls for further investigations into the role of coaching as a self-regulatory mechanism in client's striving to attain goals authentically in concordance with their congruent self.

In sum, these findings suggest several implications for research and practice, as we discuss in detail next.

3.5.1.1. Personality & affect balance in perceived competence & goal commitment

Both perceived competence (Williams & Deci, 1996) and goal commitment (Klein et al., 2001) were related to personality characteristics through affect balance. In essence, perceived

competence relates to client's feeling that they can bring about goals effectively (Sheldon, Ryan, & Reis, 1996) when they engage in a behavior that is instrumental to the desired outcome (Williams & Deci, 1996) whereas goal commitment relates to client's determination to reach a goal. Both concepts have been investigated as a mediating variable in coaching to date. While perceived competence showed low significant effect to explain the associations between Spence's (2008) GAS interview technique and client's goal attainment in coaching (Prywes, 2012), client's higher levels of goal commitment were found to have significant mediating effect on goal attainment in Prywes's (2012) study. However, the mechanism underlying the influence of client's personality on these concepts in authentic self-development has remained unexplored.

3.5.2 Role of mean & slope of affect balance in mediation

Although there is emerging focus of attention on specific coaching outputs within the boundaries of a single session or across a series of sessions (Day et al., 2006; de Haan et al., 2010; de Haan & Nieß, 2015), the present study is the first attempt to explore how authentic development emerges as specific moments of client learning. In effect, the concept of "sub-outcomes" in psychotherapy literature (Greenberg, 1986a) suggests that learning emerges locally (i.e., achieved within sessions) and internally (e.g., impacted by client's personality characteristics and explained by positive and negative affect) rather than globally (i.e., on completion of a coaching engagement) or externally (i.e., via coach's experience).

Findings in the present study indicate that while client's affect balance increases across sessions over time (i.e., slope as process variable), higher levels of average affect balance are shown to explain the direct relationship between personality and the authentic self-development composite, in particular perceived competence and goal commitment. Change in affect balance is indicated to have no explanatory power.

These findings suggest a state-dependent mediating effect of affect balance on the direct relationship between personality characteristics and client's authentic self-development. In

essence, as coaching is interpreted to have a self-regulatory influence on clients in their development process with each coaching session forming more than the sum of its individual parts, it is likely that affect balance reflects an aspect of the effectiveness of coaching. This particular aspect of the effectiveness may be explained by 'how well' rather than 'how much more or how much less' clients arrive at tapping their self-regulatory resources across sessions and over time. This interpretation may explain why change in affect balance is not found to be relevant for how it mediates the relationship between client's personality characteristics and authentic self-development in coaching. For instance, more conscientious client's change in mood does not explain why they stay committed to their goal. Instead, it is client's average increased capacity to balance positive and negative moods that may determine how well they can stay committed to goals over time and across sessions. It is the balance that counts (e.g., balance of low positive and low negative affect; balance of high positive and high negative affect). Increased authentic self-development is warranted by how uniquely clients manage their affect in the same coaching session without a particular session-level change in affect balance predicting a stronger increase in authentic self-development. As suggested by coaching literature (e.g., Ianiro, Schermuly, Kauffeld, 2013; Molyn et al., 2019; Sonesh et al., 2015) it is the consistent quality of the moment-by-moment experience that may form client's authentic self-development as directly shaped by their personality characteristics in coaching.

3.5.3 Role of personality for goal stability in authentic self-development

While perceived competence, goal commitment and goal self-concordance on completion of coaching were directly predicted by both personality traits and ABCDs, neither trait nor ABCDs are found to predict goal stability. The latter finding is potentially explainable by goal stability being neither a purely trait nor state measure. Instead, from a humanistic psychology perspective (Rogers,1961), goal stability may be a way of developing continuity and coherence across

potentially contradictory actions (Harter, 2002) and the capacity of integrating one's inconsistent behaviors into a "coherent self concept" (Boucher, 2011, p. 1267). Contradictory actions may imply that goals are malleable depending on complex situational factors (i.e., clients feel safe in coach-client relationship) as was identified in the systematic qualitative meta-synthesis (Chapter 2; Erdös, de Haan, & Heusinkveld, 2020) in coaching. They may also depend on the extent to which client's aspirations, motivations and intentions evolve over the course of coaching (Prywes, 2012). This claim finds support in Spence's (2008) work on the confounding effects of goal instability in goal setting research.

Consequently, the insignificant direct associations between personality and goal stability in the present study imply that client's capacity to develop authentically in terms of goal stability may be about maintaining their stability of goal-directed functioning (DeYoung, 2015) rather than the stability of a goal per se. In other words, having a goal is more important than having the same goal.

3.5.4 Role of affect balance in goal stability & goal self-concordance

Although the Self-Regulation-Model (SRRM) by Sirois (2015a, 2015b) was found to be the adequate conceptual framework for mapping the relationship between personality and authentic self-development, affect balance is indicated to have no direct effect on (a) goal stability and (b) goal self-concordance in the present study.

First, since no main effect was found for personality characteristics on goal stability in client's authentic self-development, a mediator analysis for affect balance is immaterial (e.g., Baron & Kenny, 1986). The lack of significant mediating effect of the relative balance between positive and negative affect on goal stability may be attributable to coaching being a complex self-regulatory engagement per se. As such, coaching can be viewed as the key contextual factor in which clients show up as self-determined individuals to adjust goals in concordance with their congruent self. Repeated goal-orientation and task-setting are likely to foster client's "continued

adjustability" in how they pursue goals. Therefore, client's continued adjustability as expressive of their stability of goal-oriented functioning rather than goal-stability itself will enhance their 'becoming one' (Sheldon, 2014) in line with their personality through coaching. This interpretation is consistent with findings in the parallel investigative approach of our coaching research, which explored the effects of movement synchrony and the role of affect balance in client's goal attainment (Chapter 4).

Second, while personality characteristics predict higher goal self-concordance at the end of coaching in the present study, affect balance does not explain the direct relationship between personality characteristics and goal self-concordance. Since goal self-concordance is positively predicted by client's personality characteristics, we speculate that clients experience coaching as a learning process in which they can attain goals with minimal pressure and compulsion (i.e., they feel more "self-concordant" in their goal pursuits) in line with their personality. For instance, Sheldon (2014) claims that individuals whose goals match their implicit personalities will feel a strong conviction and will be interested in pursuing their goals in line with their congruent self, which implies for the findings of the present study that self-concordance does not require any self-regulatory resources through affect balance in coaching. Sheldon's claim (2014) is supported by a study (Sheldon et al., 2015) that found self-concordance to be predicted by personality characteristics (i.e., implicit and explicit motives) on students' goal attainment journey.

3.5.5 Implications for coaching research and practice

Our study advances the coaching literature by indicating that affect balance plays a part in client's growth in concordance with their congruent self, specifically by mediating the relations between personality and authentic self-development (particularly, perceived competence and goal commitment) over the course of coaching. As such, we conceptualize authentic self-development as *"the process of becoming a continuously congruent self with contradictory behaviors, most*

probably against someone else's will in our social context. Coaching as a social context indicates a unique self-regulatory intervention that supports clients in their process of 'becoming'."

As incorporating the balanced representation of lower-order personality components in higher-order personality traits predicted authentic self-development through mean affect balance more consistently than a traditional measure of personality traits (Maples et al., 2014), we call for longitudinal research to further investigate the direct and indirect influence of the ABCDs of the Big Five. The aim is to further advance our theoretical understanding about the role of client's nuanced personality to models of goal-focused coaching (Clutterbuck & Spence, 2017; Grant, 2012). This theoretical understanding is important in coaching psychology as we need to have available powerful methods for studying client's internal processes, for at least three reasons: (a), coaching psychologists (Boyce et al., 2010; de Haan et al., 2013; Lai & McDowall, 2014; Smith & Brummel, 2013) signal strong interest in process research, as they increasingly seek to understand not only which personality factors contribute to coaching's effectiveness but also how personality works in coaching; (b) such advances in coaching process understanding reflects the coaching field's growing self-confidence as a hallmark of a mature science; (c) progressing the way in which we describe coaching processes promises opportunities to effect change processes through our deepened understanding of personality change. Failing to investigate the mechanisms leading from personality traits to outcomes may reduce the predictive ability of personality in supporting coach's selection of coaching techniques.

Practically, as a result of the findings in the present study we recommend coaches to grow their coaching skills and styles towards focusing on authentic self-development in coaching for clients to ultimately reach effectiveness beyond goals. In doing so, we urge coaches to work with client's perception of competence towards 'becoming one' (Sheldon, 2014), goal commitment and goal self-concordance as well as client's capacity to adapt flexibly to change in their internal and external world when striving to achieve goals. Additionally, we propose coaches to adopt a coaching style that will sustain client's efforts to reach self-congruent goals by integrating client's

balanced affective, cognitive, behavioral, and motivational personality aspects, which is likely to encourage clients to become more autonomous in their goal-striving choices.

3.6 Limitations

First, given the non-experimental character of the present study, conclusions about causal relationships were drawn post hoc. For the same reason, we propose that future studies control for and specifically focus on contextual factors of coaching interactions (Erdös, de Haan, & Heusinkfeld, 2020) examining coaching as a unique self-regulatory activity with contextual relevance. Controlling for coaching as a contextual factor with specific view to the role of personality and self-regulation in various types of coaching (e.g.., executive coaching, career coaching, life coaching) in client's authentic self-development has the potential to support the professionalization of coaching as a discipline.

Second, while randomized controlled trials are often considered to be the "gold standard' in quantitative coaching outcome research (Cavanagh & Grant, 2006), the present study analyzed coaching sessions based on a highly diverse "convenience sample" of naturalistic coaching engagements. This approach was found to be best suitable to reflect real-life coaching process effects using a single-group, pre-post, temporal design. The naturalistic character of the dataset presented in this paper is both a limitation and a strength. The naturalistic intercultural character of the sample supports generalizability of the findings. As such, the dataset of 176 coach-client dyads can be considered as an important step towards research that investigates the temporal dynamics of coaching, which normally goes unheeded in traditional outcome-type studies.

Third, we did not obtain data on coach self-reports to provide a balanced insight into coach's perception of client's learning dynamics. Nor did we account for social desirability biases or limitations of forced-choice options that are inherent in self-reports of personality and affect.

Fourth, we did not control for initial psychopathology in clients or any other influencing factors.

Fifth, as many self-reported variables correlate, there may be concern about the effects of common method variance (CMV), which is viewed as the systematic variance shared among variables resulting from a particular method used in data collection (e.g., self-report measures) rather than the constructs that the measures ought to assess (Podsakoff et al., 2003). CMV (e.g., self-source bias, self-score bias) continues to capture the attention of scholars in behavioral and organizational sciences, despite disagreement over its prevalence and nature (e.g., Podsakoff et al., 2003; Spector, 2006). While recurring to a control group is a possible way to determine any link between coaching and some of what appear to be artificially inflated relationships among variables at first glance, there exist other CMV detection techniques (i.e., marker-based methods) to identify CMV in an effective manner (e.g., Malhorta, Kim, & Patil, 2006; Richardson, Simmering, & Sturman, 2009). Yet, even the most fervent proponents of marker-based techniques caution that the utility of the marker-based technique essentially depends on the quality of the markers applied to implement those detection techniques (e.g., Lindell & Whitney, 2001; Williams, Hartman, & Cavazotte, 2010). Even while there is disagreement about which approach is most accurate, some authors recur to not recommending the use of any (e.g., Conway & Lance, 2010; Podsakoff et al., 2003). In our study, we acknowledge that it is not possible to rule out method variance completely. We hold that analytical strategies such as a multimethod multi-trait matrix (MTMM) would be ideal (Lindell & Whitney, 2001). However, the considerations put forth in our discussion section support our claim that method variance did not overly influence our results.

Sixth, while using the ABCDs of Big Five in coaching research can be considered a limitation as it is a new measure, the operationalization of the balanced ABCD content of across the personality traits in this inventory may add conceptual strength (Wilt & Revelle, 2015), and this measure predicted coaching outcomes in our study similarly to (and possibly better than at the facet level) an established measure of Big Five traits.

All these limitations influence the way we interpret the direct associations of our data. Nevertheless, the statistical methods applied in the present study offer a novel approach in investigating goal attainment and authentic self-development in coaching as a change process.

3.7 Conclusion

This project was designed to answer some coaching scholars' calls (e.g., Grant, 2012) to account for authentic self-development as the "over-arching goal of the coaching enterprise" (Grant, 2012, p.161) in future coaching effectiveness research. Filling the gap in coaching research in relation to client's authentic self-development, the present paper investigated the coaching engagement as a phenomenological and meaning-making change process (Cox, 2013), in which client's characteristics (i.e., personality) influences how change emerges for them across sessions. Based on the findings, authentic self-regulation is formulated as client's process of becoming a continuously congruent self with contradictory behaviors, most probably against someone else's will in their social context including coaching. In effect, coaching is revealed as a unique self-regulatory intervention that supports clients in their process of 'becoming one' (Sheldon, 2014).

Findings indicate that client's personality may help or hinder clients (e.g., support perceived competence, goal commitment, goal self-concordance, goal adjustment in general) in attaining authentic self-development. Affect balance explained certain aspects of this relationship positively (i.e., perceived competence, goal commitment) while it did not explain other aspects of this relationship negatively (i.e., goal self-concordance, goal stability). Exploring client's affect balance as underlying internal self-regulatory processes that links their personality characteristics and authentic self-development is important for determining at a mechanistic level why some clients have difficulty engaging in authentic self-development in their goal pursuits, while others are more successful at reaching and maintaining their authentic development. Our theoretical proposition frames the effects of client's personality characteristics in coaching effectiveness and whether and/or in what ways client's self-regulatory capacities might alter these effects.

Consequently, our findings support a new direction for future coaching effectiveness research (McDowall, 2017) in that we confirm that only longitudinal research can bring to light both the direct and indirect influences of personality and potentially other client-specific characteristics on how clients behave in accordance with their congruent self as the ultimate goal of coaching.

For practitioners, our findings imply that coaches need to get trained in and master how to (a) grow their coaching skills and styles beyond goal attainment, (b) work with client's authentic self-development as the ultimate means to reach effectiveness for clients beyond goals, (c) engage with client's personality from session to session to support client's self-perception of competence, goal commitment and goal self-concordance towards 'becoming one' (Sheldon, 2014) through coaching, (d) adopt an integrative approach to client's affective, cognitive, behavioral and motivational aspects of personality, (e) integrate skills and competences that enhance client's self-regulatory resources (i.e., affect balance) towards reaching self-congruent goals, and (f) consciously work with coaching as a contextual factor that has the potential to influence client's capacity to self-regulate beyond client's own self-regulatory resources.

Chapter 4. Change process in coaching: Interplay of movement synchrony, working alliance, self-regulation and goal-attainment

4.1 Introduction

Based on meta-analytic evidence, one may state that coaching works (Athanasopoulou & Dopson, 2018; Burt & Talati, 2017; De Meuse, Dai, & Lee, 2009; Jones et al., 2016; Sonesh et al., 2015). Coaching has been described as an effective change methodology for clients (Grant, Passmore, Cavanagh, & Parker, 2010) and it has been defined as a *'result-oriented, systematic process'* (Grant, 2003, p. 254), which could be simplified to be regarded as a goal-focused activity (Gregory et al., 2011). Despite such straightforward descriptions, changes of coaching effectiveness over the course of the coaching engagement remain elusive (Molyn et al., 2019) The question of when and why coaches should apply which coaching strategies remains a black box in coaching (Theeboom, Vianen, & Beersma, 2017). Given its methodical design, the present study comprising a large sample of naturalistic coach-client pairs focuses on coaching in organizational settings to meet this prerequisite.

Thus, the present study explores specific interactional processes through which effective change can be attained *'within and across coaching sessions including the development of the relationship'* (Myers, 2017, p. 590). The coach-client relationship is perceived as the *'most important success factor in the coaching process'* (Gessnitzer & Kauffeld, 2015, p. 178). As the role of the coach is argued to facilitate client's *'movement through a self-regulatory cycle'* (Grant, 2003, p. 255), we are interested in how the coach-client relationship affects the client's self-regulation over the course of coaching. We can find specific evidence for the relevance of the coaching relationship in sports coaching (Jowett, 2017) where the interplay between the coach-athlete relationship and self-regulation has been sufficiently corroborated (Collins et al., 2018). Additionally, our literature review conducted prior to this study (Chapter 2; Erdös, de Haan, & Heusinkveld, 2020) revealed that change outcomes are driven by both client's cognitive

and emotional processes. Considerable support for our focus on interactional processes stems from interpersonal theories (Horowitz, 2004; Kiesler, 1996), and interpersonal coordination (Bernieri & Rosenthal, 1991; Burgoon, Stern, & Dillman, 1995). Interpersonal coordination – we will use the general term "synchrony" later on – posits that the degree to which two individuals simultaneously respond to each other influences the quality of their interactions. Our study was thus conceived in the theoretical framework of embodied cognition (e.g. Tschacher & Bergomi, 2011; Wachsmuth, Lenzen, & Knoblich, 2008), with a specific focus on interactants' nonverbal behavior (Ramseyer & Tschacher, 2006).

First attempts to explore interactional processes analyzing both verbal and nonverbal behavioral exchanges act by act in coach-client dyads demonstrated that the working alliance – the quality of the coach-client relationship characterized by shared goal/task focus, trust and rapport (Bordin, 1979) – depended on the degree of dominance and affiliation of coach-client interactions (Ianiro & Kauffeld, 2014; Ianiro, Lehmann-Willenbrock, & Kauffeld, 2015; Ianiro, Schermuly, & Kauffeld, 2013; Schermuly, Schroeder, Nachtwei, & Scholl, 2010). Dominance and affiliation – the two basic axes of the interpersonal circle (e.g. Kiesler, 1996) were also found to be predictive of goal attainment in coaching (Biberacher, Strack, & Braumandl, 2010). In contrast, in the present study we are interested in exploring the role that working alliance plays in strengthening or weakening the direct association between nonverbal synchrony through movement and emotional as well as cognitive self-regulation in coaching and their association with goal attainment. There are at least two reasons for our approach to investigate working alliance as a moderator: First, the most recent meta-analysis (Graßmann et al, 2020) on the impact of the coach-client relationship on coaching outcomes – as measured by the Working Alliance Inventory (Horvath & Greenberg, 1989) – revealed that the coach-client relationship is linked to but does not cause coaching outcomes. This meta-analytic finding may be attributable to coaching in itself being a beneficial process, which may have contributed to how working alliance is commonly instrumentalized as a mediator to explain coaching success (e.g., de Haan

et al., 2013; de Haan et al., 2016; Sonesh et al., 2015b). However, related fields such as mentoring (Larose, Chaloux, Monaghan, & Tarabulsy, 2010) and counseling (Masdonati, Perdrix, Massoudi, & Rossier, 2014) demonstrate that as the nature of working alliance can change over time it can produce varying effects on outcomes. This moderating effect is coherent with the conceptualization of working alliance (Safran & Muran, 1998) positing that the degree of trust, bonding, commitment, and shared goal orientation in the relationship determine effective outcomes. Moreover, there is literature on the conceptual embeddedness of working alliance as a moderator (Holmbeck, 1997) and it is supported by change process theory in coaching (e.g. Cox, 2013). Second, other recent coaching outcome research (Molyn et al., 2019) reinforces the debate around the extent to which working alliance is attributable to how coaching as a process produces change in and for clients. In Molyn et al's (2019) study, working alliance predicts coaching outcomes only on measuring it at the initial stage and on regressing it against the outcomes of the last session. In-between sessions (i.e., 2 and 5), only shared task-setting predicts well-being as an outcome. This task-outcome effect will not be produced for each data point.

Against this background, we propose that nonverbal synchrony – measured as the coordination of body-movement between coach and client – is the interactional phenomenon which predicts goal attainment in coaching through client's emotional and cognitive self-regulation in coaching. Synchronized movements have been found to promote cooperation (e.g. Wiltermuth & Heath, 2009; Kirschner & Tomasello, 2010; Valdesolo & DeSteno, 2011), and to predict relationship quality in psychotherapy (Ramseyer & Tschacher, 2011). While coaching is distinct from psychotherapy (i.e., and other related fields) in how therapists work at emotional depth with patients and in how coaches work with goal attainment (Peltier, 2011), the qualitative meta-synthesis conducted prior to this study (Erdös et al., 2020) demonstrates that emotions play a key role in client's learning and growth process too. Therefore, in the present study, we investigate the interaction effects of body movement on both client's emotional and cognitive capacity to regulate the self to attain goals. This proposition is supported by coaching scholars

(e.g. de Haan & Duckworth, 2013) who argue that there are sufficient similarities (i.e., understanding cognitive and emotional responses, client-centered collaborative partnership) between these two fields of discipline for the relevance of psychotherapy literature to be considered in coaching process research to contribute to enhance coaching practice.

Specifically, we hypothesize that the impact of movement synchrony on client's emotional and cognitive self-regulation increases or decreases with the level of working alliance. The present investigation thus seeks to explore dynamic properties of coaching (e.g. working alliance, client / coach interactions, personality) rather than specific techniques associated with particular methods.

Taken together, the present study contributes to the literature on synchrony and coaching in two ways. First, we develop theoretical propositions outlining the indirect effects of body-movement synchrony on goal attainment via client's self-regulation capacities in coaching as a set of synchronous interaction processes. Knowledge of such processes is likely to support coaching educators in making sense of the strategic implications of body-movement synchrony in strengthening client's self-regulatory capacities as prerequisites of effective change outcomes. Second, by investigating the moderator effect of working alliance on the direct effect of body-movement synchrony on client's self-regulation, we offer a complementary perspective to the studies conducted on the main effects of working alliance on coaching effectiveness. Looking into working alliance as an interpersonal phenomenon that influences rather than a factor that ultimately predicts coaching success (Passmore & Fillery-Travis, 2011) is likely to shed new light on the role of the coach-client relationship as an interactional change process. As such, this study answers calls from coaching scholars (Myers, 2017) to identify a direction for future process research that focuses our efforts on exploring emerging properties of coaching (e.g. working alliance, client / coach interactions, personality) rather than specific techniques associated with any particular method. Progressing the body of knowledge of coach-client

generic influences on coaching as a change process can help improve practice in serving the recipients of coaching who engage in the changing.

4.2 Conceptual Background

4.2.1 Movement synchrony

Studies on synchrony in interpersonal relationships have increased in recent years (Chetouani, Delaherche, Dumas, & Cohen, 2017), and numerous positive aspects of interactional synchrony and interpersonal relationships have been reported (Chartrand & Lakin, 2013). Phenomena of social coordination are both the product of and contribute to positive interactions (Koole & Tschacher, 2016; Omer, Zilkha, & Kimchi, 2019; Stel & Vonk, 2010). More specifically, synchrony has been related to better joint performance (Cui, Bryant, & Reiss, 2012), effective communication (Jiang, Chang, Chen, Wang, & Klein, 2014), rapport (Bernieri, Davis, Rosenthal, & Knee, 1994; Hove & Risen, 2009; Miles, Nind, & Macrae, 2009), psychotherapy outcome (Altmann et al., 2020; Ramseyer & Tschacher, 2011); empathy (Bavelas, Black, Lemery, & Mullett, 1986), the smoothness of conversation (Chartrand & Bargh, 1999), and to social connectedness in general (Marsh, Richardson, & Schmidt, 2009). In this study, we will explicitly focus on synchronized movements of both coach's and client's bodies during coaching sessions.

4.2.2 Self-regulation

We consider self-regulation to be a meta-cognitive monitoring ability (Greif & Berg, 2011) that focuses on result-oriented self-reflection rather than aimless rumination (Greif, 2008) and also affects emotion regulation (Feldman, 2015; Hayes & Feldman, 2004). Self-regulation integrates self-regulatory processes 'as the set of psychological processes through which people bring their thoughts, feelings, and behaviors in line with abstract standards, goals, or values' (Koole, Kuhl, Jostmann, & Finkenauer, 2006, p. 206). These psychological processes amplify, attenuate, or

maintain the strength of various emotional reactions (Davidson, 2000; Gross & John, 1998). Self-regulatory processes have been shown to reduce experiential avoidance (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996), thought suppression (Wegner, 1994), or over-engagement in worry (Borkovec, 1994), rumination (Nolen-Hoeksema & Morrow, 1991), and over-generalization (Carver, 1998) – aspects that together facilitate emotional self-regulation (Kumar, 2002).

4.2.3 Self-regulation & movement synchrony

Links between synchrony and emotional self-regulation have been reported in developmental research, where the synchronous interaction between infant and caregiver was revealed to be essential for the development of skills for emotional self-regulation in adolescence (Feldman, 2015). In particular, affect balance characterized by emotional safety was shown to foster self-control abilities in toddlers (Feldman, Greenbaum, & Yirmiya, 1999). In a similar vein, mutual affect synchrony has been found to be associated with downregulating emotional distress (Feldman, 2007), fostering emotional safety (Feldman, 2015). Comparable links between interpersonal synchrony and emotional self-regulation have been found in close relationships of adults (Butler & Randall, 2013; Ferrer & Helm, 2013; Timmons, Margolin, & Saxbe, 2015) where co-regulation was also seen as a form of healthy equilibrium of emotional responses (Reed, Barnard, & Butler, 2015). Co-regulation may also be found in physiological synchrony (Kleinbub, 2017; Marci & Orr, 2006).

Up to now, the link between nonverbal synchrony and emotion has been examined in conversations of students (Tschacher, Rees, & Ramseyer, 2014), where synchrony in body-movements predicted positive affect.

We thus conceptualize self-regulation as the client's capacity to reflect goals and problems in a result-oriented manner (Greif & Berg, 2011; Watson, Clark, & Tellegen, 1988). We therefore hypothesized as follows:

Hypothesis 1a:

In coaching, movement synchrony (spontaneous movement coordination) increases client's self-regulation capacities as operationalized through self-reported mood.

Hypothesis 1b:

In coaching, movement synchrony increases client's self-regulation capacities as operationalized through result-oriented problem and self-reflection.

4.2.4 Goal attainment & self-regulation

In coaching, effective goal attainment (Prywes, 2012) has been demonstrated to comprise cognitive processes such as goal-oriented planning (Wood & Locke, 1990), goal commitment (Locke & Latham, 1990), perceived goal competence (Sheldon, Ryan, & Reis, 1996), goal self-concordance (Sheldon & Houser-Marko, 2001), and goal stability (Spence, Cavanagh, & Grant, 2008). The way clients engage in effective goal-attainment in association with cognitive self-regulatory capacities has been recently demonstrated in sports coaching (Collins et al., 2018). Furthermore, conscientiousness (Costa & McCrae, 1992), as a specific personality characteristic, was found to consistently predict performance (Stewart, Palmer, Wilkin, & Kerrin, 2008). In the present study, we investigated these ingredients of goal attainment (Prywes, 2012) as direct effects of sustained goal-directed behavior. By assessing goals three months after completion of coaching, the present study sought to explore goal attainment as sustained goal-directed behavior through coaching. In clients where these ingredients of goal attainment are maintained after coaching, we understand the coaching engagement to have been

successfully completed. In coaching, the highest quality form of goal attainment is attained when client's 'need to be autonomous' is met (Schiemann, Mühlberger, & Jonas, 2018a), when they attain goals through engagement in sustained goal-directed behavior beyond coaching (Bachkirova & Smith, 2015).

Coaching scholars argue that coach's way of 'being with clients' (Divine, 2009; Gendlin, 1969; Linder-Pelz & Hall, 2007; Madison, 2012; Sieler, 2010; Silsbee, 2008; Strozzi-Heckler, 2014) rather than their out-of-the toolbox way of 'doing coaching' session-by-session is likely to make a significant difference in how clients feel capacitated to attain goals in coaching. We assume that movement synchrony is one such facet of 'being with clients', that may support their capacity to engage in higher levels of engagement in goal attainment (Grant, 2003; Prywes, 2012; Spence, 2007).

Hypothesis 2a:

Higher self-regulation as operationalized through mood (PANAS, positive and negative affect) predicts higher client engagement in goal attainment in coaching.

Hypothesis 2b:

Higher self-regulation as operationalized through result-oriented problem and self-reflection (RoPS) predicts higher client engagement in goal attainment in coaching.

4.2.5 Working alliance, self-regulation & movement synchrony

In psychotherapy research, the alliance is the best-researched predictor for therapy outcome (Flückiger, Del Re, Wampold, & Horvath, 2018), and similarly, the coach-client relationship is supposed to determine coaching success (Gessnitzer & Kauffeld, 2015). In the domain of psychotherapy process research, nonverbal synchrony was found to embody aspects of the

therapeutic alliance (Altmann et al., 2020; Ramseyer & Tschacher, 2011) and also predicted therapy outcome assessed by pre-to-post symptomatology (Ramseyer & Tschacher, 2011). The In-Sync model (Koole & Tschacher, 2016) has been suggested as a possible theoretical framework for these findings, but other studies failed to confirm a positive association between synchrony and alliance (Lutz et al., 2020; Paulick et al., 2018b; Schoenherr et al., 2019a; Schoenherr et al., 2019b). One of these contradicting studies suggests that the association between nonverbal synchrony and alliance may depend on whether it was assessed from a nomothetic or an idiographic perspective (Ramseyer, 2020b). While studying nonverbal synchrony in association with working alliance from an idiographic perspective focuses on the client's subjective experience, the nomothetic approach emphasizes the statistical perspective to draw generalizable conclusions. Therefore, the relevance of nonverbal synchrony can vary largely depending on the methodological approach to analyzing process data (Ramseyer, 2020b).

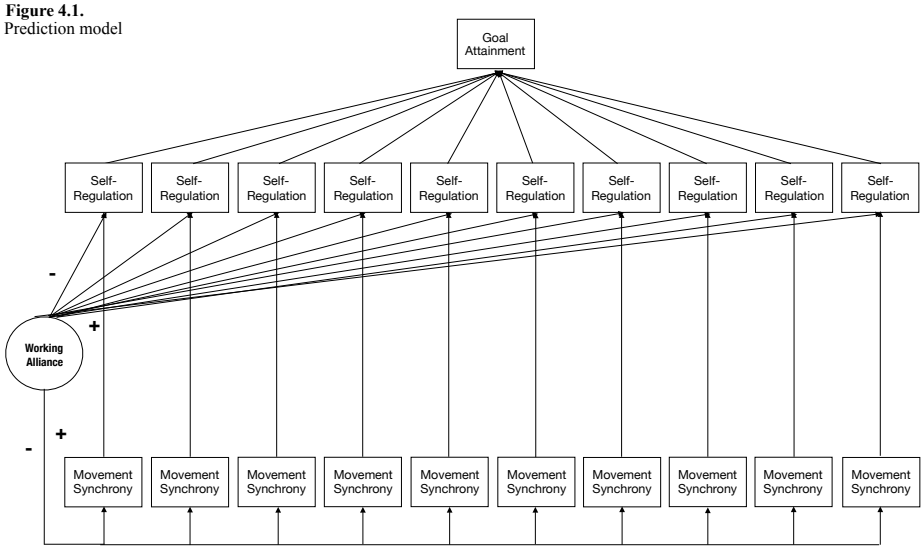
In line with findings of a recent meta-analysis investigating 27 samples (N = 3563 coaching processes) on the role of working alliance for coaching outcomes that working alliance does not cause coaching outcomes (Graßmann et al., 2020) although there is a significant positive relationship between working alliance and coaching outcomes, we propose that working alliance embodies an interpersonal variable with moderator effect. We posit that as an interpersonal variable involving openness and trust (Graßmann et al., 2020), working alliance will strengthen or weaken how clients self-regulate in association with nonverbal synchrony over time. Studying working alliance as a moderator, we offer a complementary perspective to the studies conducted on the main effects of working alliance on goal attainment in coaching.

Hypothesis 3:

Working alliance moderates the direct effects of movement synchrony on client's self-regulation (operationalized through result-oriented problem and self-reflection as well as positive and

negative affect) in such a way that the impact of movement synchrony on self-regulation increases or decreases as working alliance increases or decreases in coaching (Figure 4.1).

Figure 4.1.
Prediction model



Note. Prediction model, in which Movement Synchrony represents nonverbal body responses in dyads as measured with MEA; Self-Regulation as measured through positive/negative affect; Working Alliance as measured through Working Alliance Inventory is predicted to moderate the relationship between Movement Synchrony and Self-Regulation as a process. Goal attainment is measured through goal-directed behavior scales and is mediated via Self-Regulation as a process.

4.3 Methods

4.3.1 Design

This study involved the commitment from several international professional coaching bodies and various organizations working with internal or external coach pools to ensure the enrollment of trained coaches with adherence to at least one professional coaching organization. It was conceptualized to be maximally naturalistic in terms of sample characteristics (professional coaches, common clients, coaching setting), and also in terms of cultural diversity (Table 4.1) to ensure a certain level of generalizability.

Table 4.1.
Frequency Distribution of Sample by Country

Country	Frequency Distribution		
	Frequency	Valid Percent	Cumulative Percent
Australia	7	3.8	3.8
Austria	2	1.1	4.9
Belgium	4	2.2	7.4
Brazil	4	2.3	9.2
Canada	3	1.6	10.9
Chile	2	1.1	12.0
China	2	1.1	13.0
Czech Republic	4	2.2	15.2
Denmark	2	1.1	16.3
Ecuador	4	2.2	18.5
Egypt	2	1.1	19.6
Finland	2	1.1	20.7
France	1	0.5	21.2
Greece	9	4.9	26.1
Hungary	2	1.1	27.2
India	5	2.7	29.9
Indonesia	4	2.2	32.1
Ireland	2	1.1	33.2
Italy	4	2.2	35.3
Japan	2	1.1	36.4
Kazakhstan	2	1.1	37.5
Lithuania	2	1.1	39.2
Netherlands	22	12	50.5
Poland	3	1.6	52.2
Romania	2	1.1	53.3
Saudi Arabia	21	11.4	64.7
Singapore	1	0.5	65.2
Slovenia	4	2.2	67.4
South Africa	3	1.6	69
South Korea	2	1.1	70.1
United Kingdom	35	19	89.1
USA	20	10.9	100
Total	184	100	

Note. Frequency indicates the number of participants per country. The Valid Percent column shows the percentage that does not include missing cases. Cumulative Percent adds the percentages of each region from the top of the table to the bottom, culminating in 100.

Conceptually, the study investigated both process measures (i.e., movement synchrony, working alliance, emotional and cognitive self-regulation) and outcome measures (i.e., goal attainment). It was designed to account for the rich realities of coaching engagements (e.g., participants' choice of frequency of sessions, maximum duration of sessions, themes/goals addressed in coaching, language used in coaching, type of coaching conducted). It comprised up to 10 dyadic coaching sessions each with a minimum duration of 60 minutes as is standard in coaching. Each coaching session was video-recorded by coaches in the naturalistic setting of the coaching engagement to capture real-time face-to-face interaction processes through body movement for further analysis of movement synchrony data. Video-data collection and video-

file transmission were conducted in compliance with GDPR rules and regulations as defined in the ethics approval awarded by the research institute. Data on client's self-report process measures were collected through online questionnaires within 24 hours after each session. Questionnaires were made available in validated English language versions. Goal attainment questionnaires were administered once 3 months after the coaching engagement was completed. This design required that all participants sign a written informed-consent form prior to enrollment in this study. Links to client self-report questionnaires were transmitted to clients via their coach to ensure client's privacy and data safety. Comprehensively, the data presented here may thus be considered to be a convenience sample (Jager, Putnick, & Bornstein, 2017).

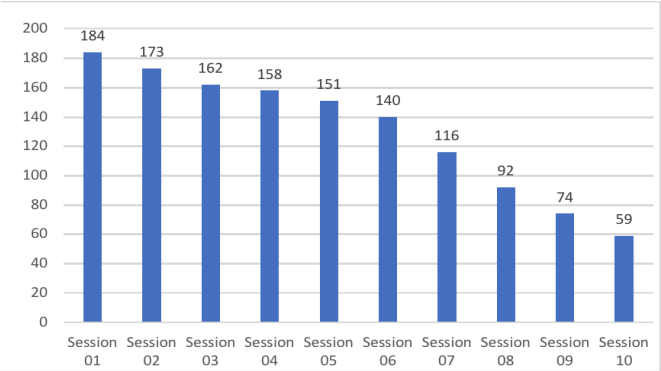
4.3.2 Recruitment

The minimum requirement for coach-client dyad recruitment (N = 150) targeted to establish statistical relevance led to the enrollment of 184 coach-client pairs (N = 184). The recruitment phase ran from June 2018 through to January 2019. It involved a rigorous selection process of individual in-depth interviews with coaches each lasting 60 minutes to contract their enrollment. Interviews were conducted by the corresponding author of this article. Coaches were guided to a dedicated research website to access detailed technical instructions for the video recording and file transfer process. And procedures as well as the specific IT support framework provided transparently for participation (www.coachingpresenceresearch.com). To identify the 184 coach-client pairs for recruitment, the project design was presented at several professional conferences around the globe between 2017 and 2018. Coaches were asked to recruit their clients for the purposes of this study and client data was coded in all steps throughout the research to ensure client anonymity. Data for N = 184 coach-client pairs from N = 99 coaches was collected between October 2018 and November 2019 (Figure 4.2). Figure 4.3 shows the distribution of coaching

sessions over the data collection phase while Figure 4.4 depicts the timespan between sessions per dyad.

Figure 4.2.

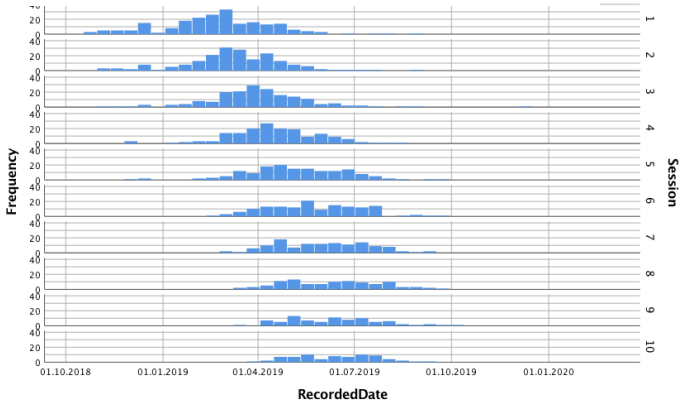
Frequency distribution of sessions in the data collection



Note. Data collection phase lasted from October 2018 through to November 2019. 184 dyads completed 1 session; 59 dyads completed 10 sessions.

Figure 4.3.

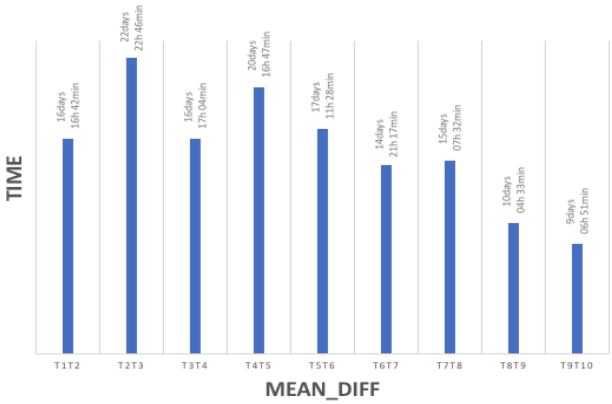
Periodic distribution of coaching sessions in the data collection phase



Note. Histogram depicts the perodic distribution of coaching sessions in the period between October 2018 and November 2019.

Figure 4.4.

Frequency distribution of session completion by dyads



Note. MEAN_DIFF depicts the average timespan between sessions T1T2, T2T3 … TIME indicates the amount of days, hours and minutes of the timespan between sessions.

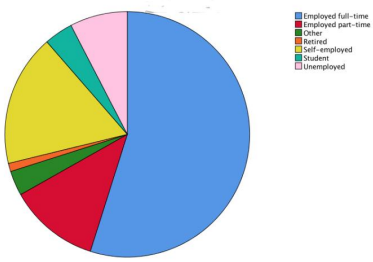
4.3.3 Participants

Coaches (N = 99) were predominantly female (n = 79; 79.8% vs male n = 20; 20.2%) while clients (N = 184) had a more balanced distribution in terms of gender (male n = 66; 35.9% vs female n = 118; 64.1%). The number of clients per coach varied: N = 31 coaches worked with n = 1 client, N = 55 coaches worked with n = 2 clients, N = 8 coaches worked with n = 3 clients, and N = 5 coaches worked with n = 4 clients. Further characteristics in terms of age were more or less mixed, as could be expected based on the recruitment strategy selected for this research project. Figure 4.5A and 4.5B show the distribution of client's employment category and level of employment in organizations.

Figure 4.5A.

Clients level of employment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employed full-time	101	54,9	54,9	54,9
	Employed part-time	22	12,0	12,0	66,8
	Other	6	3,3	3,3	70,1
	Retired	2	1,1	1,1	71,2
	Self-employed	32	17,4	17,4	88,6
	Student	7	3,8	3,8	92,4
	Unemployed	14	7,6	7,6	100,0
	Total	184	100,0	100,0	

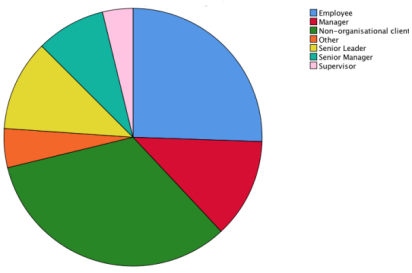


Note. The pie chart depicts the distribution of clients' category of employment by 7 categories ranging from full-time employment to unemployment.

Figure 4.5B.

Clients position in organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employee	47	25,5	25,5	25,5
	Manager	23	12,5	12,5	38,0
	Non-organisational client	61	33,2	33,2	71,2
	Other	9	4,9	4,9	76,1
	Senior Leader	21	11,4	11,4	87,5
	Senior Manager	16	8,7	8,7	96,2
	Supervisor	7	3,8	3,8	100,0
	Total	184	100,0	100,0	



Note. The pie chart depicts the distribution of clients' level of employment by 7 categories ranging from employee to supervisor.

The study was designed to represent qualified professional coaches (Figure 4.6A, 4.6B, 4.6C) specialized in leadership coaching, career management and business coaching. Coaches were selected on the basis of specific criteria (i.e., years of coaching experience, level of coaching training, level of professional practice) that were defined as sufficient for the representative quality of this study.

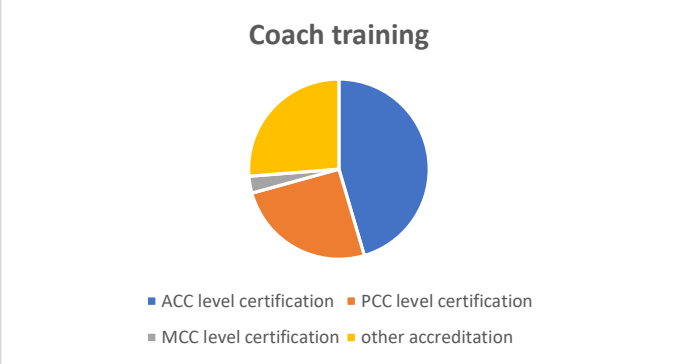
Figure 4.6A.

Coach participation based on level of experience

Note. Coaching experience prior to enrollment was defined by three categories: 1-9 years, 10+, and 16+ years

Figure 4.6B.

Coach participation based on level of training



Note. Coaching training requirements as based on ICF's (International Coaching Federation) certification levels: ACC level certification requires 60+ hours of coach-specific training and 100+ hours of coaching experience; PCC level certification requires 125+ hours of coach-specific training and 500+ hours of coaching experience; MCC level certification requires 200+ hours of coach-specific training and 2500+ hours of coaching experience. 'other accreditation' refers to any other coach-specific training outside ICF's scope of accreditation.

Figure 4.6C.

Coach participation based on level of coaching practice

Note. Coaching training requirements as based on coaches' full-time or part-time professional practice.

4.3.4 Instruments

4.3.4.1 Motion Energy Analysis

Working principle: Motion Energy Analysis (MEA, Grammer, Honda, Juette, & Schmitt, 1999; Ramseyer & Tschacher, 2011; Ramseyer, 2020) automatically analyzes video-captured sessions of dyads and compute movement synchrony. 'Motion energy' is defined as the difference in grayscale pixels between consecutive video frames (Grammer et al., 1999), the working principle of computer-vision motion detectors (Sonka, Hlavac, & Boyle, 2007). The general goal was to study body movement of both coach and client and to relate these individual movements at a dyadic level to define a measure of coach-client synchrony. We used the rMEA software package (Kleinbub & Ramseyer, 2020) to compute lagged cross-correlations to analyze the coordination of movements between coach and client. It is the most commonly applied statistical method to calculate an index of synchrony. We chose these parameters based on the first empirical study using MEA (Ramseyer & Tschacher, 2011), because in this way, we are better able to compare the psychotherapy samples and our coaching sample. rMEA provides a graphical user interface and uses algorithms (Delaherche et al., 2012) to measure pixel changes and generate time series that represent the amount of movement produced by each interactant. Correlative and regressive time series analysis (Delaherche et al., 2012) allows for computing both segments and entire time

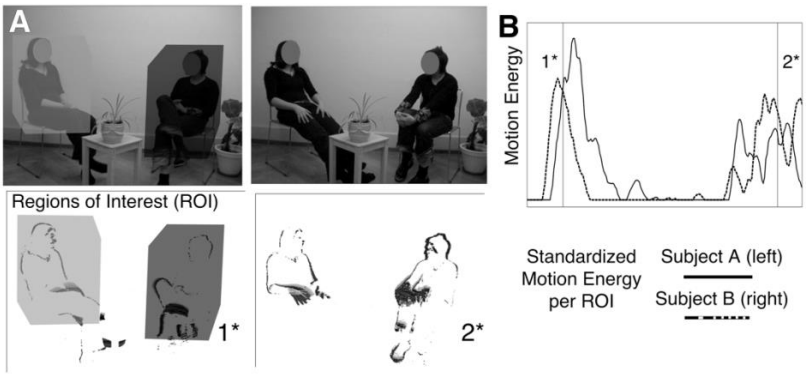
series to evaluate congruence between movement interactions. The calculation method comprises both time lags (implying that movement synchrony can occur with a delay) and zero lags (implying that synchrony through movement interactions can occur simultaneously).

Key video specifications: The present study was conducted in alignment with the specifications defined for validated MEA data analysis (Ramseyer, 2020b). The most critical specifications regarding the suitability of video material in MEA comprised parameters such as i) stable video camera; ii) static background; iii) no overlap of body movement on tape; iv) stable light conditions; v) codecs for digital recording; vi) hardware quality such as high camera resolution and no lens flares. For video-data analysis, the first 3 minutes of each session were skipped to remove sections that concerned the preparatory process of settling in for coach and client including the handling of camera positioning, showing clients to the room or starting the recording equipment. Given the international character of the study, this approach proved to be necessary (Ramseyer, 2020b) as coaches were tasked with videotaping sessions themselves. Additionally, to keep settings for each session comparable and constant, data analysis was limited to 25 minute-segments of each session irrespectively of the length of sessions contracted between coach and client.

Quantification of movement synchrony: Analyzing amounts of movement requires the definition of what is commonly referred to as regions of interest (ROIs) to measure specific movements for each interactant. For the purposes of the study, three body parts were defined as ROIs for each interactant: head to shoulder, upper body from shoulder to hips, lower body to feet. The definition of ROIs allows for marking areas that are expected to be relevant as interactants move hands and feet in their interactions. In the present study, frame-by-frame changes operationalize movement synchrony which was computed by creating times series for all three ROIs. We measured the degree to which movement interactions are congruent between time series implying that synchrony is a dynamic process and can change during interactions (Fogel, 1993). The frame-differencing algorithm captures the dynamics and extent of movement

rather than the qualitative aspect or the localization of specific movements and gestures (see Figure 4.7).

Figure 4.7.



Note: Motion Energy Analysis (MEA): Panel A = Top row = Original Movie.
Bottom Row = Frame-Differenced Pictures. Panel B: Motion Energy per Region of Interest (ROI).

Quantification of movement synchrony is based on windowed cross-correlations (Boker, Rotondo, Xu, & King, 2002). Windows describe the duration of extension of a segment where local stability can be assumed. Time-series shifts are referred to as leading and allow for distinguishing whose movements precede the other person's movement. Lags describe the duration of delay that occurs when one person's movement is followed by the other's although synchronized movement may also occur at exactly the same time. Cross-correlations capture both directions of influence. MEA thus generates quantification of body movement for each interactant, which leads to a bivariate time series characterizing movement dynamics in dyads.

In this study, MEA was used to analyze the first 25-minute video sequences of each session per dyad to ensure comparability as general session lengths varied between dyads. After video sequences were cut they were converted to .mov format prior to data analysis. The framerate was set to 25 frames/sec before running MEA. The output file includes two time series: one for client's body movement and one for coach's body movement and shows the pixel changes per 60-second segments of analysis. High values indicate big movement, low values indicate small movement. Prior to running the time-series analysis of movement synchrony, some pre-processing activities were performed (i.e., deleting video image errors, setting a minimum

movement threshold, correcting variation in ROI sizes, dividing all values by the amount of pixels present in each ROI, removing movement noise such as shuffling curtains, light change). Time-series analysis of movement synchrony comprises the cross-correlation of time-series pairs in 1-minute segments (windows of 60s) with time lags of up to 5 seconds. Cross-correlation separate segments allows for temporal changes in sessions (i.e., nonstationary synchrony). Computed correlation coefficients were aggregated to a mean to indicate the average degree of movement synchrony in each dyadic video. To differentiate between real and random movement synchrony (i.e., pseudo-synchrony) bootstrapping was conducting of a dataset of 5.000 pseudo-interactions. The mean value of movement synchrony was the product of the significant amount of synchrony and the duration of the sequence analyzed, which was multiplied by 100 to compute the frequency of movement synchrony per dyad in percent.

Pseudo-synchrony: In a further methodological step, we applied surrogate analysis by randomly shuffling the time series across participants, generating 'pseudo-interactions' (Bernieri, Reznick, & Rosenthal, 1988). In the present study, pseudo-synchrony measure was based on between-subjects shuffling as suggested by Kleinbub & Ramseyer (2020). In doing so, pseudo-synchrony measures expected levels of coincidental movement and provides an estimate for the quality of synchrony as it compares the real association of movements in genuine interaction with coincidental movements (Ramseyer & Tschacher, 2010). Comparing genuine synchronous interaction with the distribution of pseudo-synchrony yields an effect size of nonverbal synchrony (Moulder, Boker, Ramseyer, & Tschacher, 2018; Ramseyer & Tschacher, 2010).

4.3.4.2 Working Alliance (WAI)

We employed the revised WAI-SR version (Hatcher & Gillaspy, 2006) of the 12-item (7-point Likert scale) Working Alliance Inventory originally developed by (Horvath & Greenberg, 1989) to measure goal setting, the bond, and task orientation in the coaching relationship. The WAI-

SR has high internal consistency; Cronbach's a of the subdomains ranges from 0.81 to 0.90, and Cronbach's *a* of the total score is 0.91. The WAI-SR has high reliability, with test-retest reliability of 0.93 [95% CI 0.83 0.97]. With regard to construct validity, the WAI-SR correlates well with other therapeutic alliance measures. Furthermore, higher scores on the WAI-SR are associated with better treatment outcomes (Flückiger et al., 2018), confirming the WAI-SR's construct validity in accordance with (Bordin, 1979)) theory.

4.3.4.3 Result-oriented Problem- and Self-Reflection (RoPS)

Greif & Berg 's (2011) scales (27-items, 4-point Likert scale), is used to assess various aspects of goal-reflection (RoPS-GR; sample item: "The last time I thought about myself and my goals, I considered how much I am willing to invest for these goals."), reflection of self-organization (RoPS-SO; sample item: "Within the last few weeks, I thought about my personal standards, needs, and goals, and developed a plan on how to reach them.", and reflection of concrete changes from session to session (RoPS-CC; sample item: "The last time I thought about a special problem, I resolved to concretely change my behavior so that I might be better able to handle the problem in the future". Mean reliabilities of the RoPS scales range between $a = .70$ and $a = .80$, and may thus be considered acceptable.

4.3.4.4 Affective Experience (PANAS)

In order to assess the current distribution of positive and negative emotions, we used the 20-item Positive And Negative Affect Scale, PANAS (Watson et al., 1988), which reliably measures two primary dimensions of mood: positive and negative affect (alphas ranging from .86 to .90 for positive affect and from 0.84 to .97 for negative affect). The 10-item scales for each affect schedule (words describing various emotions ranging from happy to scared) are internally consistent and have excellent convergent and discriminant validity with lengthier measures of

the underlying mood factors (Watson et al., 1988). A third factor, affect balance (PANAS-AB) was calculated using a variation of the method by Koydemir, Şimşek, Schütz, & Tipandjan (2013), by quantifying the difference between positive and negative affect.

4.3.4.5 Goal Attainment

The measures used to assess client's level of engagement in goal-directed behavior three months after coaching with scores for goal attainment ingredients along 6 constructs: *Perceived Goal Competence* relating to clients feeling able to act effectively to attain important goals consists of 4 items (e.g., "I feel able to meet the challenge of attaining my goal.") as adapted from Williams & Deci (1996) with an alpha of .72; *Planning* relating to client's cognitive capacity to specify steps (i.e., how when and where) required to attain goals consists of 4 items (e.g., "I have identified specific behaviors that will help me achieve my goal." as developed by Prywes (2012) with an alpha of .74; *Conscientiousness* relating to client's propensity for planning and being purposeful consists of 10 items (e.g., "I carry out my plan.") as adapted from IPIP (2009) with an alpha of .84; *Goal Commitment* relating to client's determination to reach a goal consists of 5 items (e.g., "I am strongly committed to pursuing this goal.") as adapted from Klein, Wesson, Hollenbeck, Wright, & DeShon (2001) with an alpha of .72; *Goal Self-Concordance* relating to client's enduring interest and motivation to pursue self-set goals consists of 4 items (e.g., "You strive for this goal because of the enjoyment or stimulation which that goal provides you.") as adapted from Sheldon & Houser-Marko (2001) with an alpha of .52; *Goal Stability* relating to client's aspirations over the course of the study consists of 3 items ("My interest in this goal did not change significantly over the past three months.") as developed by Prywes (2012)with an alpha of .77. Our principal components analysis of all subscales indicated that by excluding the "Goal Stability" items, a single-factor solution explained 60.29% of the variance with an alpha of .83. The remaining five subscales intercorrelated between r =.423 to .637, thus we limit our report to this averaged goal scale consisting of 27 items.

4.4 Statistical analysis

As discussed in the section on study questions and recruitment, the analysis reported here was conducted on a sample of naturalistic coach-client processes. The sample size had been determined according to previous work with MEA providing medium effect-sizes for associations with process measures and general outcome ($r = .30$; Ramseyer & Tschacher, 2011). Given the open nature of recruitment, a minimum of 150 dyads was targeted as this would have resulted in a value of $1 - \beta = 0.97$ for the main effect showing an association between synchrony and self-regulation.

In our statistical analysis, we moved interactively from simple data models to sophisticated approaches that we found fit to compute time-series data and moderation effects in the present study. First, comparisons across groups were performed with simple t-tests and ANOVAs. Next, the temporal aspects of coaching, synchrony, self-regulation, and outcome were computed by multilevel modelling using the module GAMLj (Galluci) for the software package jamovi (The jamovi project, 2020). The data were structured in three levels: Sessions (level 1; n =1 to 10) were nested in dyads (level 2; $N = 184$) nested in coaches (level 3; $N = 99$). Dependent variables in multilevel models were either “result-oriented problem and self-reflection” (RoPS) or “affect balance” (PANAS-AB). Fixed effects were "nonverbal synchrony" (MEA), "working alliance" (WAI), and either “result-oriented problem and self-reflection” (RoPS) or “affect balance” (PANAS-AB). Additional outcome factors were the levels of "goal attainment" (GOAL). Random effects were "intercepts" of clients and coaches. Several multilevel models were constructed by subsequently adding predictors in order to explore the effects of "synchrony" and "process measures" on the cognitive and affective aspects of "self-regulation". Model-fit was compared according to the corrected Akaike information criterion (AICc). Degrees of freedom were calculated using the Satterthwaite method available in GAMLj (Galluci). Interaction effects were entered for the assessment of Hypothesis 3, predicting moderation effects of WAI on the

association between synchrony and self-regulation (RoPS and PANAS). See Figure 4.1 for the *Prediction Model*.

In a further explorative step, the temporal associations across coaching sessions were modeled using a network approach (Epskamp, 2020; Jordan, Winer, & Salem, 2020), which has recently been applied to various fields of psychology such as e.g. clinical psychology (Kaiser & Laireiter, 2019; Lutz et al., 2018). In this modeling approach, a phenomenon is seen as a network of specific elements (e.g. symptoms, factors) that dynamically interact and impact one another over time. As such, observed variables in this dataset (synchrony, result-oriented problem and self-reflection, mood) are conceptualized as causal agents in a dynamic interplay over time. We used the package *mlVAR* (Epskamp, Deserno, & Bringmann, 2019) in the open software *R* (Version 3.4.0; Team, 2008) to estimate networks for the entire sample (all clients), and networks of subgroups defined by client's level of goal attainment after coaching. Three equal groups were defined based on GOAL-scores, each containing approximately 33% of clients (high GOAL, mid GOAL, low GOAL). Clients without GOAL-assessments ($n = 8$) were not included in the network analyses of subgroups.

4.5 Results

The complete sample of 184 dyads attended between 1 and 10 sessions of coaching ($M = 7.13$; $SD = 2.88$; Median = 8). Of the 176 dyads reporting their level of goal attainment (GOAL) three months after the completion of the coaching engagement, the majority specified a high level of success from their coaching sessions, as indicated by their positive perspective on goals ($M = 5.66$; $SD = 0.72$). GOAL assessment was not related to the number of sessions attended ($r(175) = .015$; $p = .841$). Self-reported mood (PANAS) was predominantly positive ($M_{pos} = 37.44$; $SD_{pos} = 8.00$; $N = 1312$; $M_{neg} = 16.61$; $SD_{neg} = 6.54$; $N = 1312$) and there was a significant increase in positive mood across coaching (*session* = 0.44; $t(1175.2) = 8.12$; $p < .001$; ICC = 0.619), while negative mood showed a significant temporal decrease (*session* = -0.38; $t(1173.4)$

= -7.89; $p < .001$; ICC = 0.579). Affect balance (PANAS-AB) was very similar to the positive mood scale: There was an increase over time (*session* = 0.817; $t(1177) = 9.82$; $p < .001$; ICC = 0.594).

Solution-oriented problem and self-reflection (RoPS) was high ($M_{tot} = 3.13$; $SD_{tot} = 0.58$; $N = 1312$) and significantly increased with coaching (*session* = 0.07; $t(1177.6) = 16.88$; $p < .001$; ICC = 0.588). Subscales relating to the reflection of self-organization ($M_{SO} = 3.08$; $SD_{SO} = 0.65$), reflection of concrete changes ($M_{CC} = 3.17$; $SD_{CC} = 0.61$), and goal-reflection ($M_{GR} = 3.20$; $SD_{GR} = 0.66$) all showed similarly high levels, and all subscales had a significant effect of time (*session* = 0.065 to 0.071, all *p*'s <.001). A comparable result was found for the overall working alliance (WAI), which was reported to be high ($M_{tot} = 4.40$; $SD_{tot} = 0.59$; $N = 1312$) and also significantly increased across sessions over time (*session* = 0.04; $t(1159.5) = 11.74$; $p < .001$; ICC = 0.702). The subscales of bond (WAI-B), task orientation (WAI-T), and goal setting (WAI-G) all indicated similar effects already present in the overall scale: The effect of task orientation was highest ($M_T = 4.40$; $SD_T = 0.59$; $N = 1312$), followed by the effect of bond ($M_B = 4.40$; $SD_B = 0.59$; $N = 1312$) and the effect of goal setting ($M_G = 4.40$; $SD_G = 0.59$; $N = 1312$). All subscales increased across sessions over time (*session* = 0.032 to 0.052; all *p's* < .001).

Movement synchrony was clearly different from pseudo-synchrony (coincidence): The comparison with 5000 pseudo-dyads was highly significant ($t(382.8) = 9.10$; $p < .001$), and this difference had a medium effect-size (Cohen's $d = 0.67$). Across all subjects, synchrony decreased over time (*session* = -0.001; $t(1161.2) = -4.09$; $p < .001$; ICC = 0.625).

Process measures (WAI, RoPS, PANAS) were highly correlated (r = .513 to .593), while session-level synchrony was almost independent of each of the specific process-measures (r = -.062 to .013). See Table 4.2 for details.

Table 4.2. Session-report scores from post-session questionnaires

	sample (N = 184) 64.1% female											
			RoPS			*WAI*			*PANAS*			
	M	*SD*	*GR*	*SO*	*CC*	*T*	*B*	*G*	*pos*	*neg*	*AB*	*sync*
RoPS-GR (184)	3.135	0.484	.									
RoPS-SO (184)	3.069	0.513	.845**	.								
RoPS-CC (184)	3.152	0.463	.832**	.855**								
WAI-T (184)	4.200	0.627	.633**	.693**	.760**							
WAI-B (184)	4.453	0.540	.448**	.495**	.542**	.689**						
WAI-G (184)	4.347	0.620	.585**	.627**	.663**	.890**	.704**					
PAN-P (184)	37.208	6.584	.60**3	.623**	.674**	.642**	.439**	.538**				
PAN-N (184)	16.800	5.630	-.181*	-.215**	-.242**	-.226*	-.179*	-.165*	-.289**			
PAN-AB (184)	20.829	11.947	.439**	.463**	.516**	.495**	.383**	.394**	.858**	-.777**		
synchrony (173)	0.121	0.022	-.050	-.009	-.085	-.040	-.028	-.013	.007	-.111	.043	
GAS (176)	5.659	0.716	.457**	.445**	.416**	.413**	.326**	.377**	.395**	-.326**	.448**	.015

Note: Session-report scores from post-session questionnaires (WAI), result-oriented problem and self-reflection (RoPS), positive and negative affect, affect balance (PANAS), and nonverbal synchrony in all available clients (*overall*). Outcome (GOAL) after completion of sessions. Correlations of process-measures based on average scores per client, correlations with GAS based on averages across all sessions. Significance of correlations was determined by *t* test *p*-value.

* < .05; ** < .01; *** < .001

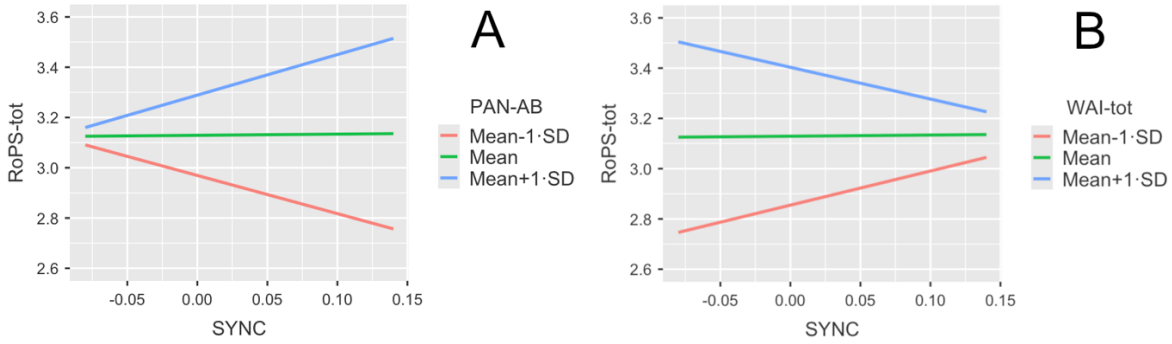
At the level of simple associations, goal attainment was not found to be related to the development of synchrony across sessions, given that the slope of synchrony, average synchrony, and initial synchrony was uncorrelated with goals (all $r < .10$; p = n.s.). On the other hand, all three self-report process measures predicted the attainment of goals, as reported in Table 4.2.

Hypothesis 1a – which predicted a positive relationship between movement synchrony and emotional self-regulation – could not be confirmed: The mixed model showed no direct influence of synchrony on affect balance, PANAS-AB ($t(1250.8) = 0.007$; $p = .994$) The assessment of Hypothesis 1b resulted in a similar picture, namely that synchrony alone did not predict overall cognitive self-regulation (total RoPS), ($t(1265.9) = 1.498$; $p = .134$).

Regarding Hypothesis 2a and 2b, we found that all self-report process measures were associated with goal attainment: As reported in Table 2, the scales of RoPS showed positive associations with goal attainment ($r = .262$ to .504), which was also the case for working alliance ($r = .283$ to .394). Positive affect as well as affect balance predicted higher goal attainment ($r = .452$; .494), while negative affect showed a negative association with goal attainment ($r = -.340$).

These effects partially fall in line with Hypothesis 3: While working alliance was not directly associated with movement synchrony, we found interaction effects (moderation) of WAI and emotional self-regulation (PANAS) on the association of movement synchrony with cognitive self-regulation (RoPS): In dyads reporting high levels of working alliance, movement synchrony was negatively related to cognitive self-regulation, while the reverse was true for dyads reporting low levels of working alliance ($t(1269.6) = -2.491$; $p = .013$) (Figure 4.8B). In contrast, in dyads reporting high levels of cognitive self-regulation, synchrony was positively associated with emotional self-regulation, while in dyads reporting low levels of cognitive self-regulation, synchrony was negatively associated with emotional self-regulation ($t(1275.0) = 2.895$; $p = .004$) (Figure 4.8A)

Figure 4.8.



Note: Panel A: Interaction between synchrony (SYNC, X-axis), affect regulation (PAN-AB; color of slopes) and cognitive self-regulation (RoPS-tot, Y-Axis). Panel B: Interaction between synchrony (SYNC, X-axis), working alliance (WAI-tot; color of slopes) and cognitive self-regulation (RoPS-tot, Y-Axis)

We further assessed these interaction effects for moderation (Omnibus Tests), and found a significant interaction for WAI (Est = 1.572; SE = 0.718; t = 2.190; 66 = 0.029), and for PANAS-AB (Est = 1.8; SE = 0.721; t = 2.587; p = 0.010). In other words: WAI moderated the effect of synchrony on cognitive self-regulation (RoPS). In other words: WAI moderated the effect of synchrony on cognitive self-regulation (RoPS): In clients with low WAI, more synchrony was associated with higher RoPS, while in clients with high WAI, less synchrony was associated with higher RoPS. The reverse was true for affect balance: In clients with high affect-balance, higher synchrony predicted higher RoPS, while in clients with low PANAS-AB, low synchrony predicted higher RoPS. These interaction effects were not found in alternative models with either PANAS or WAI as dependent variables.

In a further step, we explored the temporal relationships between movement synchrony and process measures by applying network model analysis (Bringmann et al., 2013; Epskamp, 2020). We first applied a network model to the complete sample, using all available process measures from the post-session self-reports (all scales of WAI, RoPS, PANAS), and the synchrony scores extracted from the videos with MEA (overall SYNC). For the temporal model (Figure 4.9), the strong associations within self-report measures is easily visible (connections between the same-colored circles), as well as further notable temporal associations between scales (lines between

different-colored circles): Movement synchrony has negative associations with RoPS and WAI, i.e. lower synchrony in the previous session predicted higher goal self-reflection (RoPS-GR), as well as higher goal orientation (WAI-G), and task setting (WAI-T). The only other negative association was from concrete changes (RoPS-CC) to goal orientation (WAI-G), where less concrete changes predicted higher goal orientation. The most relevant nodes in terms of in- and out-strength (the number of significant associations with other nodes) are WAI-T and RoPS-GR: They receive (*in-strength* = 2) and send (*out-strength* = 4 WAI-T; 3 RoPS-GR) positive associations (green arrows) across time. Next up is WAI-G, receiving 4 associations (2 positive and 2 negative ones). Synchrony has a total of three negative out-going connections, two with WAI (WAI-T; WAI-G) and one with RoPS (RoPS-GR). In terms of connection strength (thickness of lines), the strongest predictors are found within RoPS itself, and between RoPS and WAI. One example is the positive association between goal self-reflection (RoPS-GR) and bond (WAI-B; $r = .122$; $p < .001$). All nodes and associations related to the models with synchrony are provided in Table 4.3. In the contemporaneous network (associations between variables in the same session), synchrony was not associated with any other variable (Figure 4.10), but there are strong associations within the three process measures. The strongest contemporaneous association was found between positive affect and WAI-T, i.e. high positive affect is associated with high task-orientation in the same session. The between-network analysis suggested that in terms of average differences across dyads (i.e. on a group-level), synchrony was negatively associated with concrete changes (RoPS-CC; $r = -.148$; $p = .046$), such that less synchrony and more concrete changes was a common (significant) combination of this sample.

Table 4.3. Parameter Estimates (and Standard Errors) for Network Models

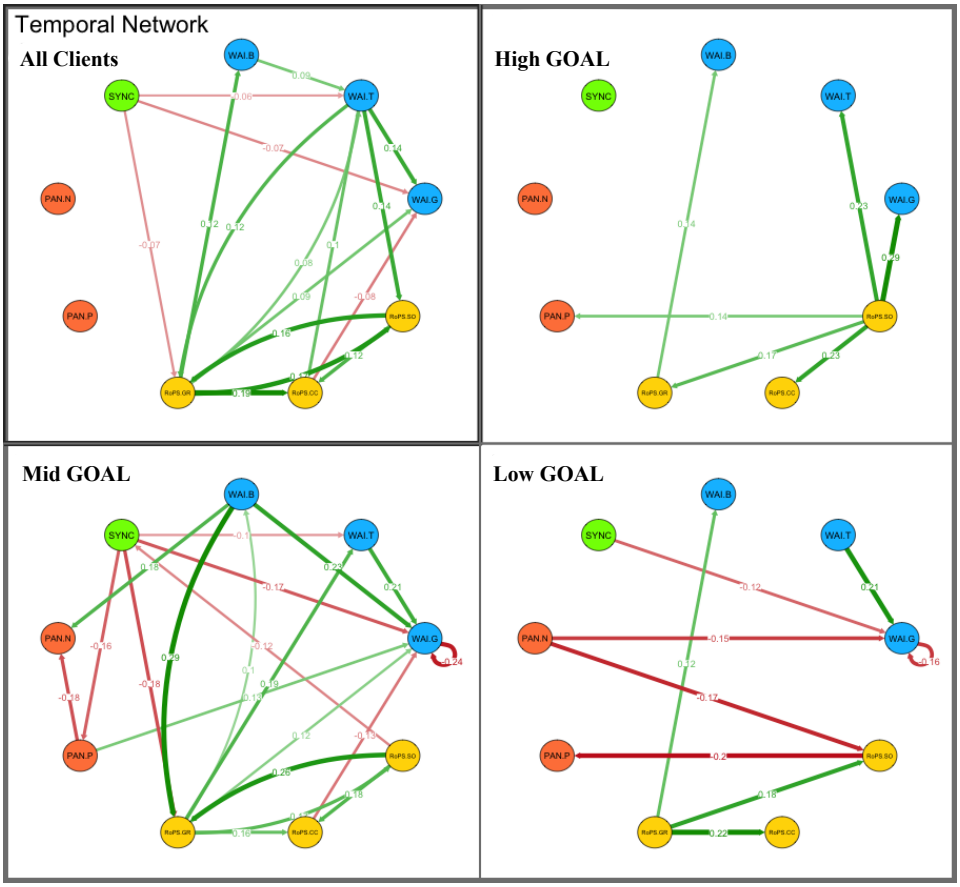
Variable	Analysis	Parameters				
Global Model		from	to	fixed	*SE*	*p*
	temporal	SYNC	WAI-T	-0.061	0.027	.023
		SYNC	WAI-G	-0.075	0.033	.023
		SYNC	RoPS-GR	-0.069	0.035	.048
		1	2	*pcor*	*p* 1 -> 2	*p* 1 <- 2
	contemporaneous	.	.	.	.	.
	between-network	SYNC	RoPS-CC	-.148	.108	.046
Outcome Level		Grouped by GOAL Outcome				
High GOAL		from	to	fixed	*SE*	*p*
	temporal	.	.	.	.	.
		1	2	*pcor*	*p* 1 -> 2	*p* 1 <- 2
	contemporaneous	.	.	.	.	.
	between-nework	SYNC	WAI-B	-.257	.015	.027
Outcome Level		from	to	fixed	*SE*	*p*
Mid GOAL	temporal	SYNC	WAI-G	-0.165	0.073	0.023
		SYNC	RoPS-GR	-0.178	0.067	0.008
		SYNC	PAN-P	-0.158	0.065	0.015
		RoPS-SO	SYNC	-0.118	0.060	0.048
		1	2	*pcor*	*p* 1 -> 2	*p* 1 <- 2
	contemporaneous	SYNC	WAI-B	-0.092	0.123	0.050
		SYNC	WAI-T	0.105	0.055	0.033
		SYNC	RoPS-SO	0.105	0.057	0.026
	between-network	SYNC	PAN-N	-.353	.001	<.001
Outcome Level		from	to	fixed	*SE*	*p*
Low GOAL	temporal	SYNC	WAI-G	-0.117	0.053	0.029
		1	2	*pcor*	*p* 1 -> 2	*p* 1 <- 2
	contemporaneous	.	.	.	.	.
	between-network	SYNC	RoPS-CC	-.356	.006	.008

Note: Parameter Estimates examine the associations between synchrony and WAI, PANAS, RoPS ($N = 176$). Only significant associations involving synchrony are shown. WAI = Working Alliance Inventory; PANAS = Positive And Negative Affect Scales; RoPS = Result-Oriented Problem- And Self-Reflection Scales; SYNC = Nonverbal Synchrony, SE = Standard Error *pcor* = partial correlation

We then performed a larger number of these analyses in order to explore the networks of different sub-groups: By dividing the sample into equally-sized groups of high outcomes (top 33%), medium outcomes (middle 33%), and low outcomes (low 33%) reported in the goal attainment scale, specific associations with synchrony were evident. We limit the description of

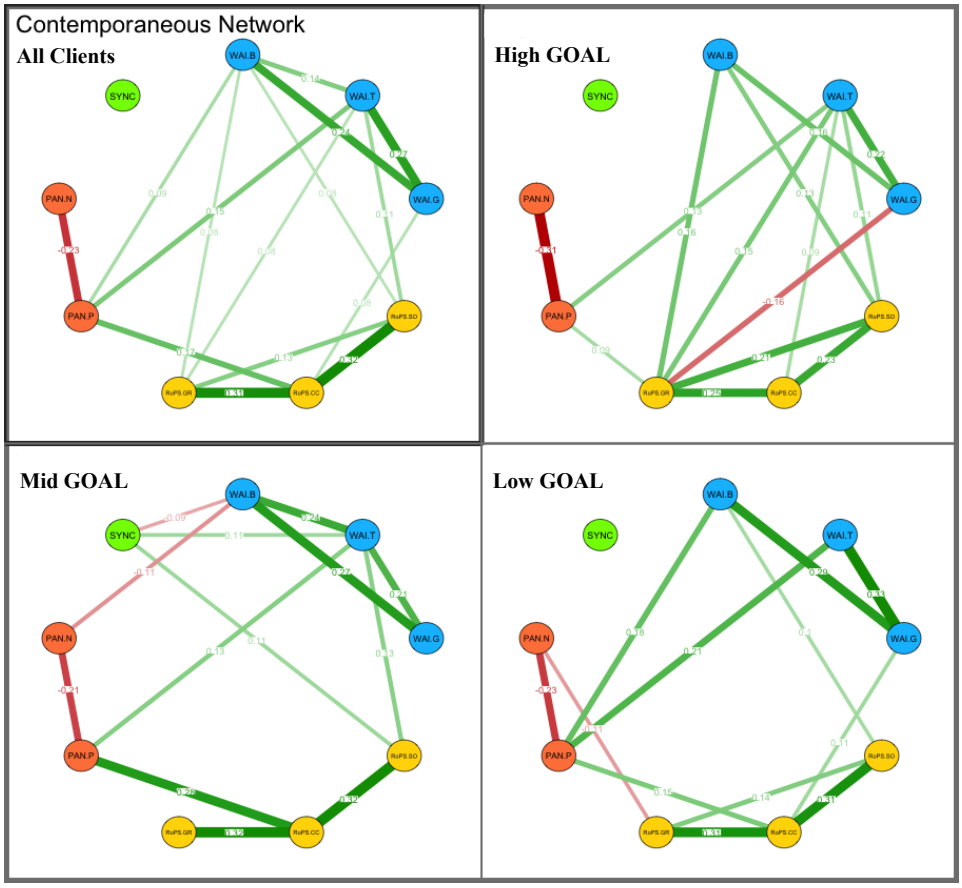
these explorative assessments to synchrony, because this was our main variable of interest. Additionally, details on the other associations may be found in the figures (Figures 4.9, 4.10, 4.11) provided below. In the high-outcome subsample (top 33% of goal attainment), synchrony had no significant association with any other variable in both temporal as well as contemporaneous networks (Figures 4.9 and 4.10, & Table 4.4). This was not the case for the mid-level outcome group: For this subsample (mid 33% of goal-attainment), numerous associations between synchrony and process variables ware found in temporal and contemporaneous networks. Two positive associations were found in the contemporaneous network, namely synchrony and WAI-B (r = .104; p = .030), and in the between-network analysis, namely synchrony and WAI-G (r = .240; p = .033). This was different in the low-outcome subsample: In the temporal network, synchrony was negatively associated with WAI-T (r = -.088; p = .046) and in the between-network analysis, where synchrony and RoPS-CC were negatively associated (r = -.283; p = .038). The mid-outcome subsample provided the highest number of associations in the temporal network: Synchrony negatively predicted PAN-P (r = -.119; p = .048), RoPS-GR (r = -.127; p = .049), WAI-B/T/G (r = -.097 to -.166; p = .011 to .039), and it was negatively predicted by RoPS-SO (r = -.125; p =.036). For the contemporaneous network, there was a negative association with WAI-B (r = -.135; p = .027) and a positive association with RoPS-SO (r = .111; p = .028). The between-network analysis (Figure 4.11) indicated that synchrony and PAN-N were negatively associated across dyads (r = -.369; p = .001). The no-outcome group was very small (n = 8) and provided insufficiently dependable results.

Figure 4.9. Temporal Network Analysis by Goal Groups



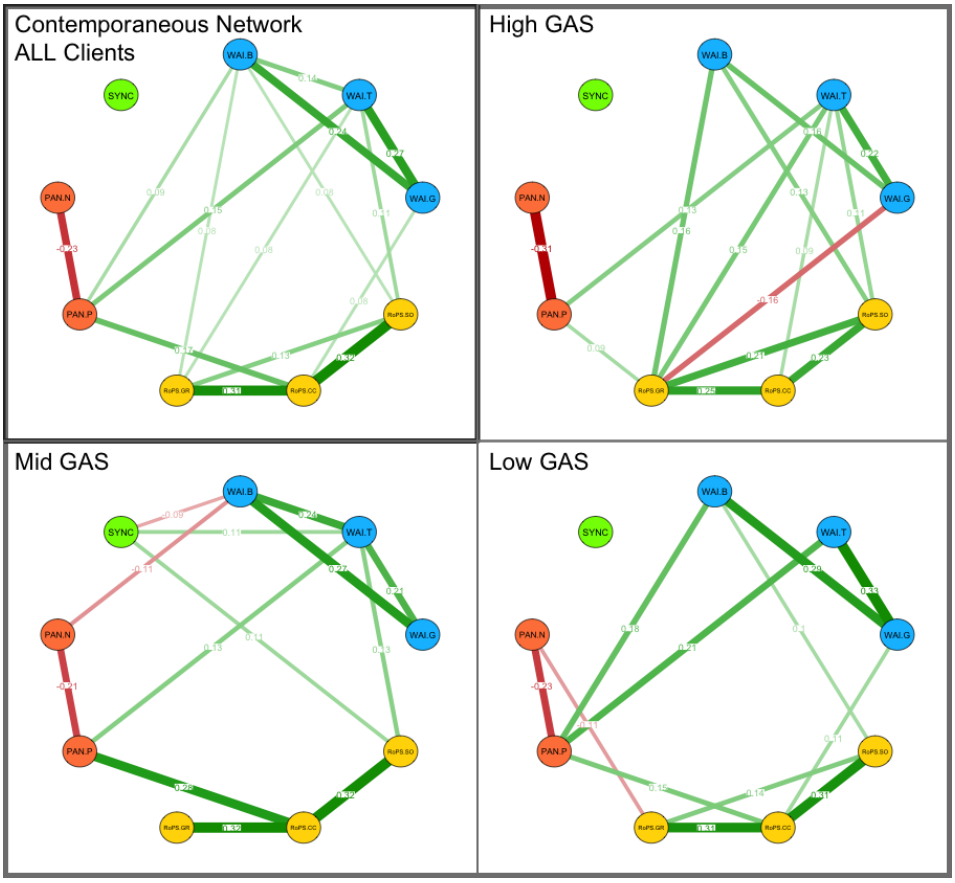
Note: Network analysis: Temporal associations between synchrony (SYNC), working alliance (WAI), and cognitive self-regulation (RoPS). Arrows indicate associations between previous session (*t*-1) and current session (t). Positive association = green line, negative association = red line. Only significant associations are depicted.

Figure 4.10. Contemporaneous Network Analysis by Goal Groups



Note: Network analysis: Contemporaneous associations between synchrony (SYNC), working alliance (WAI), and cognitive self-regulation (RoPS). Lines indicate associations in the same session (t). Positive association = green line, negative association = red line. Only significant associations are depicted.

Figure 4.11. Contemporaneous Network Analysis by Goal Groups



Note: Network analysis: Contemporaneous associations between synchrony (SYNC), working alliance (WAI), and cognitive self-regulation (RoPS). Lines indicate associations in the same session (t). Positive association = green line, negative association = red line. Only significant associations are depicted.

Considering the moderation effects reported for Hypothesis 3, the network analyses provide further evidence that movement synchrony and other process variables are differentially associated in this sample of coaching clients. Most notably, we found that in highly successful dyads (High GOAL group), movement synchrony plays a much lower role than in the other two groups (see associations reported in Table 4.4).

Table 4.4. Parameter Estimates (and Standard Errors) for Mixed Effects Models Examining

Fixed Effects	Hypothesis 1a (PANAS-AB)	Hypothesis 1b (RoPS-tot)	Hypothesis 3a (PANAS-AB, GOAL)	Hypothesis 3a (PANAS-AB)	Hypothesis 3b (RoPS-tot, GOAL)	Hypothesis 3b (RoPS-tot)
Intercept	20.866*** (0.761)	3.145*** (0.039)	20.756*** (0.596)	20.727 (0.596)	3.145*** (0.025)	3.141*** (0.025)
Session	0.799*** (0.085)	0.070*** (0.004)	0.210* (0.088)	0.208* (0.087)	0.044*** (0.004)	0.044*** (0.004)
WAI-tot			5.180*** (0.635)	5.578*** (0.625)	0.378*** (0.027)	0.395*** (0.027)
PANAS-AB					0.011*** (0.001)	0.011*** (0.001)
RoPS-tot			5.183*** (0.612)	5.013*** (0.588)		
Synchrony	0.088 (12.733)	0.924 (0.617)	-5.709 (11.662)	-4.059 (11.513)	0.641 (0.521)	0.689 (0.527)
SYNC X PANAS-AB					0.131** (0.045)	0.105* (0.043)
SYNC X RoPS-tot			27.293 (20.458)	31.961 (19.654)		
SYNC X WAI-tot			-8.207 (19.627)	-10.928 (19.341)	-2.184* (0.877)	-2.206** (0.838)
GOAL high vs mid			-2.308 (1.473)		-0.113t (0.058)	
low			-5.207*** (1.493)		-0.227*** (0.060)	
ICC (Client)	0.570	0.497	0.521	0.530	0.395	0.422
ICC (Coach)	0.130	0.303	<0.001	<0.001	0.102	0.058
AICc	9233.258	1447.685	8690.667	8989.017	992.115	1092.471

t $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$
† Process measures were centered at their grand mean

Note: Parameter Estimates (and Standard Errors) for Mixed Effects Models examines the associations between process variables (WAI, PANAS, RoPS, and Synchrony; N = 184/176). ICC = Intraclass Correlation; WAI = Working Alliance Inventory; PANAS = Positive And Negative Affect Scales; RoPS = Result-Oriented Problem And Self-Reflection Scales; SYNC = Nonverbal Synchrony

4.6 Discussion

The comprehensive data analysis exploring a multi-cultural sample of naturalistic coaching processes revealed a whole range of differential effects of process variables and outcomes. For reasons of conciseness, we will discuss in detail two main hypotheses-driven results deemed relevant for the theoretical framework of the coaching literature on synchrony, self-regulation and goal attainment, as follows: (a) the temporal nature of movement synchrony in goal attainment, and (b) the moderation effects of working alliance.

Notwithstanding our focus in our discussion, we generally highlight that measures of the coaching process indicated that a solid working alliance, a high level of goal-reflection, and a predominance of positive mood predict successful goal attainment. Therefore, we recommend coaching research to investigate the role of goal reflection and positive mood in the coaching relationship as instruments that are likely to foster client's goal-directed behavior. Indeed, investigating these facets may enrich theoretical development in coaching. The low goal stability scores we found in our sample may indicate that coaching is not about 'reaching one goal' for clients but about forming client's capacity to engage in goal-driven activities through coaching. Consequently, coaching practitioners may pay specific attention to autonomy as an element of coaching effectiveness. This approach is plausible as one recent coaching study (Schiemann, Mühlberger, & Jonas, 2018b) shows that the highest quality form of goal attainment is attained when client's need to be autonomous is met, that is when coaching is about clients feeling self-determined to attain goals beyond coaching. We close our discussion by proposing recommendations for future research and practice.

4.6.1 The temporal nature of movement synchrony in goal attainment

First, the level of synchrony across sessions was not linearly associated with process measures (at the level of the same session) or global outcome (on completion of coaching). Instead, network analyses uncovered that movement synchrony and goal attainment in coaching were associated in a peculiar temporal manner. These temporal network analyses suggest three intriguing aspects of movement synchrony that warrant further inspection: (a) higher levels of synchrony were found to be present at the outset of the coaching process, and synchrony showed a linear trend for a temporal decrease; (b) a lower level of synchrony in a previous session (t-1) predicted higher task-orientation, higher goal-setting, and higher goal-reflection in the next session (t).

We may interpret these two associations as being indicative of some "correctional mechanism" that emerges at a point in time where the coaching process is perceived to be deteriorating. Higher levels of synchrony at the outset of the coaching process may indicate that greater effort is required in terms of nonverbally “getting onto the same page” or “attaining the same wavelength with each other", which later becomes less important as coaching sessions progress successfully towards goal attainment. In contrast, in dyads where progress is perceived to “get off track” as client self-reports showed low cognitive and emotional self-regulation and low quality of coach-client relationship, higher levels of movement synchrony at the outset may be indicative of emerging efforts to correct the deteriorating quality of the coach-client relationship or the yet unproductive coaching process. In other words, movement synchrony appears to be effective where the working alliance is not solid enough. Although counter-intuitive at first glance, this indication is consistent with the findings in this study that lower levels of synchrony in a previous session predicted higher levels of working alliance and cognitive self-regulation in the next session. The reason may be that higher levels of movement synchrony function as a corrective mechanism where working alliance seems to be low. However, where working alliance is high movement synchrony is low with positive ripple-effect on working alliance and cognitive self-regulation in the next session.

Research in social psychology (Chartrand & Lakin, 2013) found that mimicry is a valuable means to influence interaction processes between interlocutors. While movement synchrony was investigated as a phenomenon outside conscious control, it implies a possible means to repair the quality of the coaching relationship by influencing clients through movement coordination. We conceptualize synchrony as a way of being present with clients authentically: It is the coach’s way of *‘being with clients’* (Divine, 2009; Gendlin, 1969; Linder-Pelz & Hall, 2007; Madison, 2012; Sieler, 2010; Silsbee, 2008; Strozzi-Heckler, 2014) rather than their out-of-the toolbox way of *‘doing coaching’* session-by-session that is likely to make a significant difference in how clients feel capacitated to attain goals in coaching. All the more,

as our temporal network analyses suggest that the creation of what we refer to as an 'authentic environment' (i.e., coach showing up authentically (Boucher, 2011; Harter, 2002; Sutton, 2020), which may invite client to have the courage to do likewise) in coaching is of greater effect than movement coordination per se. Thus, we argue that a solid working alliance renders the significance of movement synchrony redundant while it renders movement synchrony necessary where working alliance is poor. Figure 4.10 highlights the significance of bonding and task setting as two key elements of working alliance for goal attainment in coaching.

While previous coaching research investigating nonverbal behavior in dyads (Ianiro & Kauffeld, 2014; Ianiro et al., 2013; Ianiro et al., 2015; Schermuly et al., 2010) showed that the working alliance depended on the degree of dominance and affiliation of coach-client interactions, our study focused on the moderating role of the working alliance in the association between movement synchrony and self-regulation towards goal attainment. While these previous coaching studies acknowledge the aspect of reciprocity as a key element of interpersonal theory (Kiesler, 1996) and thus converge with the theoretical framework of interpersonal synchrony (Feldman, 2007; Feldman, 2015), they differ in their focus on affiliation and dominance and how these interpersonal factors impact on the working alliance in coaching. As such, they complement the findings of the present study in how we can view nonverbal behavior as an interactional process that can be both the product of and a causal contributor to positive interactions as suggested in social psychology (e.g. Chartrand & van Baaren, 2009). In other words, movement synchrony per se cannot be interpreted without putting it in context with other variables such as goal attainment and working alliance as a moderator.

Second, regarding goal attainment, the present study further revealed that (c) in the group with average coaching success (mid 33%), movement synchrony in a previous session predicted a lower level of bonding (WAI-B) in the next session. Similarly, movement synchrony was also negatively associated with the level of bonding of the same session. These

associations between movement synchrony and bonding were not found in the less successful group (low 33%), while in the most highly successful group (top 33%), movement synchrony was positively associated with bonding of the same session. In this context, the negative relationship between movement synchrony and bonding in the group with average coaching success was not anticipated in our hypotheses. It contrasts findings by Ramseyer & Tschacher (2011) and Altmann et al. (2020). However, such an effect is not new in research on movement synchrony and basically reflects the status quo of contradictory outcomes on synchrony. A recent study interpreted a similar negative association as a possible indicator for different aspects evident in idiographic versus nomothetic samples (Ramseyer, 2020b). Indeed, findings in psychotherapy point towards an optimal (middle) level of synchrony, where low movement synchrony was found to be an indicator of drop-out and high movement synchrony to be a predictor of early termination (Paulick et al., 2018a). This also falls in line with recent work, where movement synchrony in the third session of psychotherapy predicted lower success later in therapy (Lutz et al., 2020). The current findings in synchrony research indicates that outcomes produced in the present study are theoretically relevant as they call us to investigate synchrony differentially rather than as an input-output variable and in context with other variables. Specifically, we interpret the goal-related findings in the temporal networks (i.e., low synchrony is associated with high goal attainment while high synchrony is associated with low goal attainment and low goal orientation, and that medium level of goal attainment is not associated with positive or negative affect) as yet another indication that synchrony emerges as a correctional mechanism in dyads. These findings are indicative that high initial movement synchrony not necessarily implies good contact between coach and client. This may be compared to findings in student dyads, where synchrony was higher in discussions of a conflictual type compared to discussions characterized by collaboration (Tschacher et al., 2014). The fact that in the study investigating student dyads, the highest levels of synchrony were evident while students were engaged in a very specific ‘fun task’ (building a menu of

disliked foods) further suggests a dependency of the level of synchrony on the situation or the task at hand. In a similar vein, the success in collaborative tasks has been shown to be highest in weak coupling, i.e. not in totally synchronous behavior (Abney, Paxton, Dale, & Kello, 2015; Wiltshire, Steffensen, & Fiore, 2018). In the present study, as clients reported low levels of bonding in sessions with high levels of movement synchrony at same session level, i.e. in session where coaches may have attempted to correct for the dyadic relationship or the coaching process being off track, the optimal level of movement synchrony may not effectively only lie somewhere in-between too little ("bored-teenager-effect") and too much synchrony ("mime effect") as described by Boker (2004) and Ramseyer (2010). Instead, it may depend on the contextual situation and the characteristics of the verbal exchanges between interaction partners, or the quality of the coaching relationship as revealed in the present study. As mentioned above, so-called weak coupling may indeed be an important condition for successful social or collaborative interaction (Wiltshire et al., 2018). Given the non-experimental character of the present study, this question remains unanswered, but we think that future studies should try to control for and specifically focus on contextual factors of coaching interactions (Erdös et al., 2020).

4.6.2 Moderation effects of working alliance

First, while movement synchrony assessed through body movement was found to be only marginally related to measures of outcome and process, interaction effects in mixed model analyses showed that the effect of movement synchrony on cognitive self-regulation (RoPS) largely depended on the expression of working alliance as well as mood as moderators. In dyads with high working alliance, movement synchrony appears not to act as a beneficial factor for other process variables, while dyads with low working alliance showed a positive connection between synchrony and cognitive self-regulation (Figure 4.8B).

Second, a different moderator pattern was found regarding affect balance: Dyads with high levels of affect balance were characterized by a positive association between movement synchrony and cognitive self-regulation (Table 4.4). This further corroborates our claims that movement synchrony needs to be considered in interaction with other variables to make sense in coaching effectiveness. The moderator effect of mood came as a surprise, all the more as it was not hypothesized as part of the prediction model (Figure 4.1).

Generally, the particular finding on the role of the working alliance as a moderator suggests a state-dependent influence of bonding on the relationship between synchrony and client's self-regulatory capacities. In essence, coaching is a dynamic learning process with each coaching session forming more than the sum of its individual parts implying that bonding as an aspect of the strength of the coaching relationship may determine 'how well' rather than 'how much' coach and client are present synchronizing in each session. Graßmann et al (2020) report that working alliance is linked to but does not cause coaching outcomes. The debate around goal/task focus, trust and rapport between coach and client is attributable to how coaching as a process produces change in and for clients (Molyn et al., 2019). Eventually, the findings in this study propose that working alliance embodies an interpersonal variable rather than an outcome variable. As such, it strengthens or weakens the direct relationship of movement synchrony and self-regulation.

4.6.3 Recommendations for future research

Conclusively, we propose the following recommendations for coaching practice and research: (a) based on the findings of the role of affect balance moderating the association between movement synchrony and cognitive self-regulation, we propose future coaching research to further explore emotion in the coaching relationship. We find support for this recommendation in the qualitative meta-synthesis conducted prior to the present study (Erdös et al., 2020) indicating that client's affective state matters in coaching effectiveness. Investigating the link

between movement synchrony and emotion may deepen our understanding of the whole body as an important 'signalling' device in emotional processing (Gelder, 2006), which may have important implications for coaching as self-regulation is linked to authentic self-development as the ultimate goal of client's personal learning process (Grant, 2012).

4.6.4 Recommendations for future practice

In coaching practice, we recommend coaching training providers to train and practitioners to practice how to strengthen client's self-regulatory capacities through working with emotions, in particular working with moods. There is support for this approach in one coaching study indicating that coach's moods and interpersonal behavior impact client's effectiveness in coaching (Ianiro & Kauffeld, 2014). As emotions strengthen or weaken the client's capacity to reflect goals when "being with the coach", we recommend paying greater attention to emotion in interactional processes between coach and client beyond any particular coaching methods; (b) based on the findings of movement synchrony of behavior as a correctional mechanism, coaching training providers and practitioners may focus on honing their capacity to identify the quality of the coach-client relationship effectively at the outset of the coaching engagement. This may help to then be able to flexibly and spontaneously use movement synchrony towards client's effectiveness in coaching. Generally, we recommend coaches to be trained in being and staying spontaneous and flexible throughout their coaching engagements as it is not worthwhile starting to synchronize in a linear manner. Other factors (i.e., task setting, bonding, affect balance) appear to be more important. Investigating authenticity may be relevant in coaching as one study in social psychology (Kavanagh, Suhler, Churchland, & Winkielman, 2011) indicates that there is a cost of trust and reputation to mimicking interaction partners, which corroborates our claims that movement coordination as a correctional mechanism may do more harm than help client's effectiveness in coaching; (c) a fruitful avenue for coaching research may be to explore movement synchrony as a key element of client's capacity to engage in goal-

directed behavior beyond coaching by investigating this interpersonal phenomenon in conjunction with other variables; (d) it may be of value to explore movement synchrony both in coaching research and practice by looking into the ways in which synchrony plays out in virtual coaching settings, which was not the context of the present study.

4.7 Limitations

First, the coaching sessions analyzed in this study were not part of a randomized controlled trial, which is often found to be the "gold standard' in quantitative outcome research (Cavanagh & Grant, 2006). Instead, this study comprises a highly diverse "convenience sample" of naturalistic coaching sessions as such a sample was held to be best suited to reflect real-life coaching process effects using a single-group, pre-post, temporal within-subject and between-subject design. Yet, it is our impression that the naturalistic character of our dataset is both a limitation and an asset. The 184 dyads assessed across their individual processes allow insights into the dynamics that normally go unheeded in a traditional outcome-type study. Hence, we regard this dataset as an important – tentative – step towards more temporally oriented research in coaching. The fact that some hypotheses were not confirmed may be viewed as a motivational push towards further exploration in this domain.

Second, apart from the objectively quantified amount of movement synchrony, all post-session and post-coaching measures were based on client self-reports. Coach self-reports did not form part of the study design. Given the international character of this study, coaches were required to manage the entire process of multiple video file submissions in line with strict ethical guidelines on their own. Despite the desirability for coach self-reports to offset the reliability of client self-reports in this study, coach self-reports would have added to the procedural complexity of this study beyond feasibility for coaches.

Third, while removing "goal stability" as a goal-attainment subscale strengthened the significance of goal outcomes as they relate to cognitive self-regulation in client's change

process, it means that we did not explore its low significance in the present study. However, we acknowledge that this choice provides a new avenue for further coaching research to investigate the essence of goal stability as an element of goal-directed behavior in coaching.

Fourth, there was no control for initial psychopathology or any other influencing factors. All these three limitations influence the way we interpret the direct associations of our data.

4.8 Conclusion

This study contributes to the literature on movement synchrony and coaching in four ways. First, we develop theoretical propositions outlining the indirect effects of synchrony on goal attainment in coaching. Investigating these effects, we find evidence that coaching is not a linear input-output mechanism but a complex dynamic change process (Erdös et al., 2020). In particular, interaction terms in network models suggest that higher levels of synchrony may be interpreted as an indicator of some "correctional mechanism" that may emerge at a point in time where the coaching process is perceived to be deteriorating. Furthermore, the optimal level of movement synchrony may highly depend on the contextual situation and the characteristics of the verbal exchange between coach and client.

Second, by investigating the moderating effects of working alliance on the direct effects of movement synchrony and client's self-regulation, we offer a complementary perspective to the studies conducted on the main effects of working alliance on goal attainment in coaching. Our findings suggest a state-dependent moderating influence not just of overall working alliance and bonding more specifically but also of mood on the relationship between synchrony and client's self-regulatory capacities. The complementary perspective is important as viewing working alliance as an interpersonal phenomenon rather than as an outcome variable sheds new light on the role of working alliance in coaching as a dynamic change process to investigate in the future. The unexpected moderating role of emotional self-regulation equally provides fresh

avenues for focusing our attention on emotion in researching coaching as an interactional change process in the future.

Third, the interaction terms in the multiple mixed models indicate that movement synchrony predicts high cognitive self-regulation when paired with low task setting in coaching. This finding is indicative of coaching engagements in which (a) coach and client focus predominantly on goal-directed behavior beyond goal attainment, (b) the strength of the coach-client relationship is determined by the level of task setting, and (c) authenticity and flexibility mark the coaching process, in which the extent to which coach and client synchronize becomes obsolete. Thus, the current study enhances our understanding of the effects of client's self-regulatory and relational coaching processes in association with movement synchrony as an unexplored phenomenon. It indicates that a task-specific result-oriented reflection style and affect balance direct efficient action regulation between coach and client towards successful goal attainment, and that this association may contribute to how we can develop self-regulatory theory beyond coaching.

Fourth, we have a gap in our understanding about how coaching as a process works to produce change in and for clients. Exploring synchrony in temporal analyses of multiple mixed models in interaction with client's self-regulatory capacities and goal attainment is an important attempt to start explaining and building knowledge about how clients attain effectiveness through coaching in sessions and over time. Knowledge of the requirement to investigate multiple interaction processes that integrate various variables of coaching effectiveness is likely to support sponsors of coaching, professional bodies and coaching educators in making sense of the implications of coaching as a change process initiative. As such, this study answers calls from coaching scholars (Myers, 2017) to identify a direction for future coaching process research that focuses our efforts primarily on exploring generic influences (e.g. coaching relationship, client characteristics) on the coaching process rather than specific techniques associated with any particular method. Progressing the body of knowledge of generic

interactional influences on coaching as a change process can help improve practice in serving the recipients of coaching who engage in the changing.

Chapter 5. Movement synchrony over time: What's in the trajectory of dyadic interactions?

5.1 Introduction

In Chapter 4 of this thesis we investigated – among other things - the impact of nonverbal synchrony through movement on several aspects of coaching such as emotional and cognitive regulation as well as two specific aspects of goal attainment using a process-oriented lens. In investigating the impact of movement synchrony as a predictor, we computed the values for the average movement synchrony between dyads of coach and client across time segments and coaching sessions. In effect, we produced a mean of the temporal movement synchrony data by (a) averaging movement synchrony cross-correlations both between coaching session segments and within dyads in sessions, and (b) computing intercept, slope, and other coefficients of the best fitting curve to these average values across sessions and within coach-client dyads to predict self-regulation and goal attainment as moderated by working alliance in coaching. This means that in Chapter 4 we did not

(i) compute average movement synchrony per session / dyad to explore the specific temporal pattern of movement synchrony across a) the cluster of dyads that completed 10 coaching sessions, and b) all 173 dyadic interactions with a varied number of coaching sessions;

(ii) study the development of movement synchrony dynamics of a total coach-client trajectory within a session to explore synchrony dynamics in the first session as compared to synchrony dynamics in the final session for that dyadic trajectory;

(iii) study the development of movement synchrony dynamics of all coach-client trajectories within a session to study synchrony dynamics in all first sessions as

compared to synchrony dynamics in all final sessions for the entire set of dyadic trajectories.

All three avenues may be useful to yield insights that can be further investigated in coaching research on the basis of hypothesis-testing studies or applying descriptive approaches to enhance our understanding of coaching as a change process.

In Chapter 5, we will focus on avenue (i). The aim is to start enhancing our understanding of the possible dynamics of movement synchrony as a time series development for each coach-client dyad that completed exactly 10 coaching sessions. Additionally, we look into the time-series development of movement synchrony for all 173 dyads in the present sample. In doing so, we adopt an exploratory perspective to depict best fitting curves for the serial representation of non-verbal interaction processes across those sessions/dyads. The goal of exploring the two different clusters is to look into possible nuanced patterns of movement synchrony and their potential relevance for our meaning making of the dynamics of movement synchrony across sessions. Additionally, we will discuss avenues (ii) and (iii) as specific ways in which to conduct future studies on movement synchrony that can complement coaching literature on interactional processes in coaching.

In our investigations in Chapter 5, movement synchrony represents the series of the average amount of non-verbal spontaneous responsiveness between coach and client per session (see 5.2 below for a detailed conceptualization). The development of movement synchrony across sessions over time within the total coaching trajectory of dyads that completed 10 coaching sessions as well as all 173 dyadic trajectories with a varied number of coaching sessions may suggest important avenues for future investigations in coaching research as a signal of effectiveness in coaching that is shaped by both coach and client in how they interact through spontaneous responsiveness dynamically. All the more, as in Chapter 4 we discussed that movement synchrony appears to play a significant albeit complex role in client's goal

attainment. This complexity calls for digging deeper into the serial representation of movement synchrony. Therefore, in Chapter 5 the main purpose is to depict the development of movement dynamics of the total trajectory of coach-client dyads (both across 10 sessions and across all 173 dyadic interactions with a varied number of sessions) to further discuss ways in which to investigate and clarify its predictive, mediating or moderating effects in future coaching research.

The necessity of digging deeper into the serial representation of movement synchrony is grounded in latest developments in psychotherapy research. As discussed in Chapter 4, Ramseyer (2020) posits that therapy research has recently produced heterogeneous associations between movement synchrony and working alliance and rather homogeneous results when it comes to therapeutic success (Paulick et al., 2018a). A most recent study indicates that nonverbal synchrony in the third session of psychotherapy resulted in lower success later in therapy (Lutz et al., 2020). Specifically, therapy research on nonverbal synchrony as a process measure has revealed that low nonverbal synchrony may be an indicator of undesired drop-out of therapeutic treatment while high nonverbal synchrony may be a predictor of successful early termination (Paulick et al., 2018a; Schoenherr et al., 2019). Therefore, digging deeper into the serial representation of movement synchrony includes correlating the level of nonverbal synchrony with the number of sessions to explore the potential relationship between mean levels of synchrony and effects of undesired drop-out or early termination in our study.

Given the richness of the most recent evidence-base on nonverbal synchrony in psychotherapy research and despite the fact that psychotherapy studies investigated interventions for social anxiety disorder while coaching involves working with a non-clinical population (Peltier, 2011), we are interested in gaining deeper understanding of the development of movement synchrony in coaching. All the more, as the findings of the study presented in Chapter 4 converge with the rich nature and multilayered facets that nonverbal synchrony appears to have for outcomes both in psychotherapy and coaching as an interactional

change process. Therefore, the overall aim of Chapter 5 is to provide fresh avenues for coaching researchers to further explore the relevance of the development of movement synchrony across sessions over time for client's coaching outcomes in the future.

In providing a description of the development of movement synchrony as a time-series measure, this Chapter (a) briefly conceptualizes movement synchrony to reflect the purpose of gaining deeper understanding of the development of movement synchrony in coaching, (b) outlines the measurement of the concept in greater detail to clarify the methodical approach, (c) describes the results of the explorative investigation of the time-series development of movement synchrony, and finally (d) discusses the explorative findings in the context of coaching research and practice suggesting recommendations for future coaching research and practice. The research question in this exploratory study is: what is the specific temporal pattern of movement synchrony in the total trajectory of coach-client dyads that completed 10 coaching sessions and the set of 173 dyads with a varied number of sessions?

5.2 Conceptual background

5.2.1 Movement synchrony

Based on the literature summarized in Chapter 4, movement synchrony (Ramseyer & Tschacher, 2011) is considered a spontaneous nonverbal interactional variable beyond consciousness between coach and client. It was found to have implications for client's affective and cognitive regulatory capacities and to be influenced by the quality of the coach-client relationship in client's goal attainment process. Specifically, findings in Chapter 4 indicate that it is not the 'how much more' (i.e., quantity) but rather 'how well' (i.e., quality) coach and client synchronize in sessions over time that may lead to clients regulating or dysregulating in coaching. Therefore, Chapter 5 considers movement synchrony as an operationalization of the psychological construct congruence (Shapiro, 1965) between coach and client in how well-matched coach and client answer to each other through their nonverbal behavior, which was

found in social psychology to be important for interactants' psychological safety (Feldman, 2007). It is possible that the level of this embodied congruence (i.e., how well coach and client synchronize) is part of some authentic contact between coach and client as theorized by Paulick et al (2018a) in psychotherapy that has implications for how movement synchrony changes (i.e., increases or decreases) in the course of the coaching process. It is also possible that the level of embodied congruence is part of transference and counter-transference dynamics (Freud, 1917) as the unconscious redirection of feelings from one person to the other in the coaching relationship (de Haan, 2011; Lee, 2014), or a nonverbal manifestation of enhanced listening in coaching (Whitworth et al., 2007). In one study (Turner, 2010), 83% out of 235 coaches reported considering nonverbal responsiveness as transference while 77% reported considering nonverbal responsiveness as counter-transference. In another study (Cremona, 2010), coaches reflected the physical manifestation of their emotional processes in the coaching process and gave feedback to clients about their nonverbal responses as a way to cope with emotions. All these concepts suggest various ways in which movement synchrony may serve as embodied contact to explore unconscious dynamics in coaching.

However, as discussed in Chapter 4, movement synchrony is interpreted as a 'way of being present with clients authentically' suggesting that the quality of nonverbal responses between coach and client (i.e., congruence) depends on how present coach and client are to each other's needs. Therefore, we argue that anchoring movement synchrony theoretically as congruence in coaching literature can enhance our understanding of coach-client interactional processes and the context in which to measure this concept in the future (i.e., what it may predict or be associated with). Theoretically, the psychotherapeutic construct of congruence as a key element of the therapeutic relationship (Rogers, 1957) is well-established in coaching (Jackson, 2017) and supports the concept of reciprocity of movement synchrony. However, being authentic with each other as an expression of reciprocal nonverbal exchanges has remained unexplored in coaching. So far, congruence has been investigated as a form of coach's presence

in coaching (Jackson, 2017). Specifically, presence has been looked at as the coach's capacity to direct awareness to the 'here and now' of a coach-client interaction (Silsbee, 2008). Silsbee (2008) recognizes the relevance of coach's internal congruence as 'the body able to work in partnership' (Silsbee, 2008, p. 162) and recommends to work with somatic awareness, self-observation and urges to catch conditioned responses. He claims that coach's presence in coaching 'evokes change in others' (Silsbee, 2008, p. 5). While coaching theory has so far focused on congruence as an in-person phenomenon, movement synchrony is conceived as a between-person interactional exchange. The relevance of movement synchrony as an authentic reciprocal accordance of nonverbal responses between coach and client is reflected in the dynamical systems view that action is followed by perception as conceptualized in ecological psychology (Gibson, 1966) and in phenomenological philosophy (Merleau-Ponty, 2002). In simple terms: the body provides authentic information that includes signals that will be used by interaction partners to navigate a social environment (Coey, Varlet, & Richardson, 2012). The perspective of embodied congruence is well established in presence-based coaching (Silsbee, 2008) following Bluckert's (2006) idea of the use of self (i.e., working with the awareness of cognitive and emotional responses as they manifest in the body as the authentic instrument to indicate what is going on for us in the moment) in coaching as an instrument to experience the client and to explore dynamics in the coach-client relationship. However, embodied congruence has remained a coach-specific concept of presence.

As a result, for the purposes of Chapter 5 and based on the findings presented in Chapter 4, movement synchrony indicates the authentic and spontaneous nonverbal responsiveness between coach and client as the reciprocal capacity to be present and direct immediate attention to emerging needs in the coaching relationship towards goal attainment. Both coach and client have needs in the coach-client relationship that ultimately shape the way coach and client respond to each other through movement, that is their physicality (Jackson, 2017). Nonverbal responses are recognized as the ultimate expression of authenticity in the coach-client

relationship as physicality (i.e., body) is the instrument that will indicate the extent to which we are congruent in answering to each other any given moment.

5.2.2. Investigating the total trajectory of coach-client dyads

As indicated in Chapter 4, some coaching researchers (Ianiro, Lehmann-Willenbrock, & Kauffeld, 2015; Ianiro, Schermuly, & Kauffeld, 2013; Ianiro & Kauffeld, 2014; Schermuly & Scholl, 2012) have made first attempts to investigate interpersonal behavior analyzing both the verbal and nonverbal behavioral exchanges act by act in coach-client dyads to understand interactional processes in coaching as a process. One study (Ianiro & Kauffeld, 2014) comprising 48 coach-client dyads used the discussion coding system (DCS, Schermuly & Scholl, 2012) with four coders assessing affiliation and dominance expressions in coach's and client's interaction behavior. This study found a direct association between coach's dominant-friendly coach behavior in the first coaching session and client's dominant-friendly interaction behavior, which was reported to be directly influenced by coach's mood (positive affect and calmness) prior to the first coaching session. This study also found a positive direct relationship between client ratings on the working alliance after the fifth coaching session as influenced by coach's positive affect and calmness. While dominant-friendly interaction behavior does not reflect the essence of nonverbal synchrony in this thesis, these studies share one core commonality: they investigated coaching as a process over time and their findings on interactional processes suggest that time and number of sessions appear to play a key role in how clients attain goals in coaching.

Elsewhere, as addressed in Chapter 4, psychotherapy studies suggest a trend for a positive association between mean levels of nonverbal synchrony and various facets of therapy such as working alliance as the key success factor (Flückiger, Del Re, Wampold, & Horvath, 2018). Yet, associations between self-reported relationship quality and nonverbal synchrony across multiple sessions within dyads (Ramseyer et al., 2019). could not be corroborated. These

developments call us to look into the difference between mean levels of nonverbal synchrony and the temporal patterns and dynamics of movement synchrony across various numbers of sessions, which Chapter 5 seeks to elucidate. This approach falls in line with claims in psychotherapy (Ramseyer, 2020) that there is need to research nonverbal synchrony involving more factors than reported so far (e.g., contextual factors, number of sessions spent in a therapeutic intervention) to clarify the impact that nonverbal synchrony can have on outcomes. In Chapter 5, we are particularly interested in clarifying the implications of how movement synchrony changes (i.e., increases or decreases) for enhancing our understanding of the role of movement synchrony in coaching as a change process.

5.2.3 Automated measurement of nonverbal synchrony

One of the aims of this thesis is to respond to the commonly shared limitations of low inter-rater reliability (Baesler & Burgoon, 1987) in general and the use of self-reports in coaching process research (e.g., Bozer et al., 2013). Therefore, we opted to use video-based data analysis (see 4.3.4.1 in Chapter 4 for details) to provide a more objective alternative to the use of coder ratings to measure nonverbal behavior. In principle, coder rating of nonverbal synchrony consists of evaluating the degree of shared focus of attention, responsiveness and reciprocal engagement, and the match or mismatch of postures or facial expressions (e.g., Chartrand & Bargh, 1999; Lindsey, Mize, & Pettit, 1997). Raters assess how well behaviors between interaction partners are congruent to measure nonverbal synchrony. While there are prominent examples of coding systems to measure nonverbal interactions such as the Facial Action Coding System (Ekman, Friesen, & Hager, 2002) or the Berner System to assess body postures (Frey, Hirsbrunner, & Jorns, 1982), these approaches are time consuming and prone to error (Baesler & Burgoon, 1987; Bernieri, 1988). Therefore, the use of video-based data analysis appeared to be the most appropriate to provide a solution to the issues of the time-consuming nature of coder ratings and the use of self-reports to provide results in coaching process research.

The first studies that attempted to apply the automated measurement of nonverbal synchrony investigated caregiver-infant-interactions (Watanabe, 1983) in developmental research. These studies found higher nonverbal synchrony in interactions between caregiver and own infant than in interactions with other infants (Bernieri, Reznick, & Rosenthal, 1988). Since then, more generally, the automated measurement of nonverbal synchrony in dyads in social psychology (Paulick et al., 2018a; Ramseyer, 2020) has contributed to deepening our understanding of movement synchrony as the mutual regulation of dyadic meaning-making (Tronick & Beeghly, 2011) implying that interactional exchanges represent alternating periods of dynamic patterns of matching, mismatching or reparation, which has implications for how relationships can develop over time. Although this temporal development suggests an increasing level of synchrony over time, recent studies looking into nonverbal synchrony in psychotherapy (e.g., Altmann et al., 2020; Paulick et al., 2018a; Ramseyer, 2020) show the opposite development. The same holds true for findings of our study into movement synchrony, as reported in Chapter 4.

While there is a growing number of studies in research fields such as psychotherapy and developmental sciences investigating nonverbal synchrony using automated measurements (Paulick et al., 2018a), coaching research has remained focused on looking into effects of verbal (e.g., Bachkirova, Sibley, & Myers, 2015; Cilliers, 2005; Gessnitzer & Kauffeld, 2015; Schermuly & Scholl, 2012) rather than nonverbal behavior in coaching process research. To date, the few coaching studies on both verbal and nonverbal behavior (Ianiro, Lehmann-Willenbrock, & Kauffeld, 2015; Ianiro, Schermuly, & Kauffeld, 2013; Ianiro & Kauffeld, 2014) have either focused on the nonverbal behavior of the client or that of the coach, showing, for instance, that coach's nonverbal behavior plays a decisive role in the development of the coach-client relationship (e.g., Ianiro & Kauffeld, 2014). Although these studies have explored the effects of verbal and nonverbal exchanges in coaching as a series of interactional processes using sequential process analysis, researching nonverbal synchrony in coach-client dyads via

automated measurement methods has remained unaddressed. However, this development may simply be due to the perception that we lack the availability of sufficiently objective and economic means of measurement rather than the lack in the interest in this research theme.

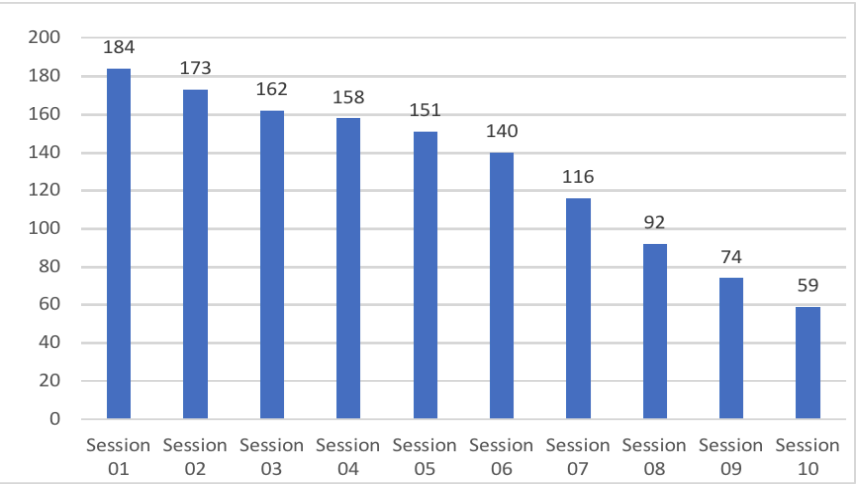
5.3 Methods

5.3.1 Design

The exploratory investigations of this part of the thesis included $N = 173$ out of $N = 184$ coach-client dyads with a set of $n = 982$ sessions (Figure 1). $N = 11$ dyads had only one session and were excluded as no change from session to session can be shown for these dyads. The naturalistic design of the study in terms of sample characteristics (e.g., professional coaches, common clients, coaching setting, and cultural diversity) was conceived to ensure a certain level of generalizability. As such, the study accounts for the common realities of coaching interventions (e.g., nature of contracting, frequency of sessions, maximum session length, coaching goals, language used, type of coaching) as it did not seek to create a laboratory setting to obtain results. Therefore, while the study comprised a maximum of 10 coaching sessions per coach-client dyad, each required to hold sessions with a minimum of 60-minute duration in the data collection phase, coach-client dyads were free to choose the number of sessions to be held at their discretion, as was standard in each coach's contracting practice. Therefore, the present study includes dyads that among others completed max. 7 sessions ($N = 116$). The observational study design implies that some coaches completed their 10 hours of coaching engagement earlier than others (see Figure 5.1 for a complete overview). Each coaching session was video-recorded by coaches in the naturalistic setting of the coaching engagement. The goal was to capture real-time face-to-face interactions through body movement for further analysis of movement synchrony.

Figure 5.1.

Frequency distribution of sessions in the data collection phase



Note. Data collection phase lasted from October 2018 through to November 2019. 184 dyads completed 1 session; 59 dyads completed 10 sessions.

Where coaches conducted 60-minute sessions, they delivered 10 video-taped files while others provided fewer video-recorded sessions where their engagement was to end sooner (see Chapter 4 for a detailed description of the study design). For the purposes of automated video-data analysis in coaching as a non-clinical helping intervention, it was assumed that clients have the full capacity to nonverbally synchronize (e.g., Ramseyer & Tschacher, 2011; Kupper et al., 2015) and are not subject to diagnostic inclusion criteria (e.g., psychosis, substance dependency).

5.3.2 Exploratory approach

The exploratory approach of this part of the thesis comprised two avenues, as follows: First, the goal was to classify types of movement synchrony patterns per dyad and number of sessions (n = 10 for N = 59 dyads, and subsequently n = 982 for N = 173 dyads) on the basis of the general shape of the curve identified as the best fit to represent consecutive instances of movement synchrony per client averaged across sessions. Therefore, the best curve fit is based on varying number of sessions per dyad (Figure 5.1). Curve fitting is one of the most powerful and most widely used analysis tools to examine the relationship between one or more predictors

and a multiple response variable, with the goal of defining a "best fit" model of the relationship. We used a curve estimation procedure as a statistical approach (see 5.4 for a detailed description of data analysis) to explore a number of curve types that would best depict nonverbal synchrony patterns of coach-client dyads over a specific number of sessions. In our case, we opted to apply this classification approach to N = 59 (n = 590 dyadic interactions, 10 sessions) and subsequently to N = 173 coach-client dyads (n = 982 dyadic interactions) as this approach was found to be most appropriate to depict the longest time-series available in the data set to derive insights to answer the research questions. This means that the curve part representing max. 5 sessions is based on more data points than the curve part representing 10 sessions. Second, the goal was to explore the possible impact of factors such as client age, coach gender, client gender, coach's experience, and number of sessions on the curve type identified to best fit the movement synchrony pattern per dyad over time (N = 173). In sum, the same exploratory avenue to classify types of movement synchrony patterns per dyadic interactions was conducted in two iterations for: i) N = 59 dyads (n = 590 dyadic interactions) and ii) N = 173 dyads (n = 982 dyadic interactions computed as follows: 173*2+162-158+151+140+116+92+74+59 = 982) based on the varied number of coaching sessions (Figure 5.1).

5.4 Data analysis

The entire data set was analyzed on the basis of N = 173 out of N = 184 coach-client dyads. There is video-taped material for all sessions in the dataset applied to this exploratory approach. The varying length of the coaching sessions (see 5.3.1 for details) is the result of the naturalistic design of the study and represents fully completed sessions in all but two dyadic cases where the dyads terminated the coaching engagement prematurely. In one case the client decided not to travel to the coach's office for video recordings arguing that he could no longer fit in the time to travel the distance he needed for coaching sessions to be video-recorded in the coach's office. In the other case, the coach reported an early termination of the coaching engagement

as the client had indicated having reached her goal earlier than contracted for in the coaching agreement. All the other coaching engagements were concluded as planned. Neither case was excluded from the dataset for analysis as in both cases clients completed their goal-attainment questionnaire in line with the requirements for participation in the research project and thus agreed to be considered as completing their contribution to the research project successfully. The low dropout rate is owing to the rigorous pre-selection process that the researcher put in place prior to project kick-off. From originally $N = 198$ coach-client dyads having indicated their interest in participating in the study, $N = 184$ dyads eventually agreed to participate in the research and concluded their process as agreed. Apart from the two cases of premature termination detailed above, there were no dropouts in the course of the study *per se*. As the pre-selection interviews conducted with coaches were clear about the requirements of the study and coaches were granted a reflection period to decide their coming onboard of the project, $N = 8$ coaches took the final decision to not be recruited.

To answer the first aim of the exploratory approach, after plotting average session movement synchrony per dyad and the number of sessions completed per dyad, data was transferred to SPSS V.23. Curve estimation function was used for data analysis.

The Curve Estimation procedure was selected to produce curve estimation regression statistics and related plots for 8 different curve estimation regression models (i.e., cubic, exponential, linear, quadratic, inverse, logarithmic, growth, and S-curve) as these models were expected to show best curve fit for each coach-client dyad. For each model, ANOVA produced values for regression coefficients, multiple R, R^2, adjusted R^2, standard error of the estimate, predicted values, residuals, and t-statistics as prediction intervals. The model also showed F-statistics to account for the improvement in model error as well as the p-value to further show predictive significance in the model. As all-lag values for movement synchrony are usually small in rMEA (e.g., for dyad 101, session 1, all-lag value equals 0.1521) data were increased by factor 10 (i.e., 0.1521 becomes 1.521) for calculating the estimated best curve fit (data can

be obtained on request). This factoring step was carried out to improve the readability of data and did not affect statistical results.

The next step involved identifying the best fitting curve for the $N = 59$ coach-client dyads that completed $n = 10$ coaching sessions (i.e., $i = 590$ interactions) as these dyads comprise the biggest amount of synchrony data per dyad available in the dataset. Therefore, they provide the highest resolution for curve fit (data can be obtained on request). Best curve fit was determined for each curve plot using R^2 / F / and p-value as effects of significance and visually inspected by researcher and statistician applying the four-eye principle. This process resulted in the reduction of curve types to the most commonly occurring ones in the group of dyads that completed 10 coaching sessions to comprise the cubic / quadratic / linear decrease / linear increase / linear constant curve types, and to exclude curve types with no or few entries in that particular data sample using the curve estimation equations:

Linear model equation is $Y = b0 + (b1 * t)$.

Quadratic model equation is $Y = b0 + (b1 * t) + (b2 * (t)^2)$.

Cubic model equation is $Y = b0 + (b1 * t) + (b2 * (t)^2) + (b3 * (t)^3)$, where Y is movement synchrony, bx are equation coefficients and t represent time series (1 to 10).

Regression estimation was rerun to estimate best curve fits using the reduced curve types across $N = 59$ coach-client dyads again. Next, dyads were clustered in 5 clusters as per best curve fit for (a) linear decrease, linear increase or linear constant, (b) cubic, or (c) quadratic curvature fit. Finally, ANOVA was applied to calculate the best fitting curve type for each coach-client dyad over 10 sessions.

To answer the second aim of the exploratory approach, cross-correlation analysis was run to measure the relationship between best fitting curve type as a movement synchrony pattern and gender coach / gender client / gender coach-client dyad / client age / coach's years of experience.

Finally, for an overview of best-curve-fit estimations, mean session movement synchrony values were used for all coach-client dyads that completed 10 sessions to calculate the best curve fit for linear / cubic / quadratic curve types.

We repeated the same data analysis process per each dyadic interaction (N = 173) and the varied number of coaching sessions in the dataset.

5.5 Results

5.5.1 Statistical results

As reported in Chapter 4, real synchrony was found to be significantly different from random synchrony ($t(382.8) = 9.10$; $p < .001$). The difference between real and random synchrony had a medium effect-size (Cohen's $d = 0.67$). Across all subjects, synchrony decreased over time (*session* = -0.001; $t(1161.2) = -4.09$; $p < .001$; ICC = 0.625).

Predictors

In the group N = 59 that completed 10 coaching sessions, n = 11 were male coaches, n = 48 were female coaches; n = 20 were male clients, and n = 39 were female clients. In dyads, male only pairs were n = 8; female only pairs were n = 36, and mixed pairs were n = 15. In terms of client's age, n = 34 were between age 26 – 45; n = 15 were between age 46 – 60; n = 4 were below age 26; and n = 6 were older than 60 years.

In the dyadic group N = 173 with the varied number of coaching sessions, n = 29 were male coaches, n = 144 were female coaches; n = 61 were male clients, and n = 112 were female clients. In dyads, male only pairs were n = 14; female only pairs were n = 95, and mixed pairs were n = 64. In terms of client's age, n = 98 were between age 26 – 45; n = 56 were between age 46 – 60; n = 9 were below age 26; and n = 9 were older than 60 years, with n = 1 client age bracket data invalid. Additionally, coach's experience ranged between n = 81 coaches with 1 –

9 years of experience, *n* = 82 coaches with 10+ years of experience, and *n* = 10 coaches with 16+ years of experience.

Regarding *curve types* for the *N* = 59 coach-client dyads that completed 10 sessions were, *n* = 24 dyads had a best curve fit for linear decrease; *n* = 14 had a best for cubic curvature; *n* = 13 had a best fit for quadratic curvature; *n* = 4 had a best curve fit for linear constant, and *n* = 4 had a best fit for linear increase curvature.

Regarding *curve types* for the *N* = 173 coach-client dyads with the varied number of coaching sessions, *n* = 51 dyads had a best curve fit for linear decrease; *n* = 48 had a best for cubic curvature; *n* = 46 had a best fit for quadratic curvature; *n* = 5 had a best curve fit for linear constant, and *n* = 23 had a best fit for linear increase curvature.

5.5.2 Exploratory outcomes

5.5.2.1 Best fitting curves for dyads with 10 coaching sessions

Table 5.1 shows the entire set of best curve fit estimation values for all the dyads (*n* = 32) in the cluster identified with the best 'linear' (decrease, increase, or constant) curve fit. The predictive value of this best curve fit was determined using the parameter estimates R^2-ed / F / *p*-value for significant. Subsequent visual inspection of the curve plot confirmed the best fitting curve. Table 5.2 shows the entire set of best curve fit estimation values for all the dyads (*n* =27) in the cluster identified with the best 'cubic' and 'quadratic' curve fit.

Table 5.1.

Cluster Dyads with Linear Curve Fit

	Model Summary			ANOVA					Coefficients				
									Unstandardized coefficients		Standardized coefficients		
	R Square	Adj R Square	Std. Error of Est.		Sum of squares	df	Mean Square	F	Sig. / p-value		unstand. B	unstand. CoStE	Coef. Std. Error	Stand. Coef. Beta	t
SYN 102	0.193	0.037	-0.083	Regression	0.014	1	0.014	0.311	0.592	Session	-0.013	0.023	-0.193	-0.558	0.592
				Residual	0.349	8	0.044			(Constant)	1.088	0.143			7.621 0.000
SYN 301	0.870	0.854	0.086	Regression	0.401	1	0.401	53.78	0.000	Session	-0.070	0.010	-0.933	-7.333	0.000
				Residual	0.060	8	0.007			(Constant)	1.327	0.059			22.489 0.000
SYN 302	0.726	0.692	0.177	Regression	0.661	1	0.661	21.23	0.002	Session	-0.090	0.019	-0.852	-4.607	0.002
				Residual	0.249	8	0.031			(Constant)	1.485	0.121			12.315 0.000
SYN 601	0.005	-0.119	0.150	Regression	0.001	1	0.001	0.042	0.843	Session	-0.003	0.017	-0.072	-0.205	0.843
				Residual	0.181	8	0.023			(Constant)	1.600	0.103			15.568 0.000
SYN 702	0.007	-0.118	0.085	Regression	0.000	1	0	0.053	0.823	Session	-0.002	0.009	-0.081	-0.231	0.823
				Residual	0.057	8	0.007			(Constant)	1.412	0.058			24.394 0.000
SYN 1402	0.138	0.031	0.127	Regression	0.021	1	0.021	1.285	0.290	Session	-0.016	0.014	-0.372	-1.133	0.290
				Residual	0.128	8	0.016			(Constant)	1.133	0.086			13.097 0.000
SYN 1701	0.088	-0.026	0.182	Regression	0.025	1	0.025	0.768	0.406	Session	-0.018	0.020	-0.296	-0.877	0.406
				Residual	0.265	8	0.033			(Constant)	1.773	0.124			14.273 0.000
SYN 2001	0.637	0.591	0.067	Regression	0.062	1	0.062	14.02	0.006	Session	-0.027	0.007	-0.798	-3745.000	0.006
				Residual	0.035	8	0.004			(Constant)	1.401	0.045			30.833 0.000
SYN 2502	0.546	0.489	0.188	Regression	0.339	1	0.339	9.607	0.015	Session	-0.064	0.021	-0.739	-3.099	0.015
				Residual	0.282	8	0.035			(Constant)	1.126	0.128			8.774 0.000
SYN 2602	0.214	0.115	0.137	Regression	0.041	1	0.041	2.175	0.178	Session	-0.022	0.015	-0.462	-1.475	0.178
				Residual	0.149	8	0.019			(Constant)	1.209	0.093			12.945 0.000
SYN 3204	0.250	0.157	0.094	Regression	0.023	1	0.023	2.671	0.141	Session	-0.017	0.010	-0.500	-1.634	0.141
				Residual	0.070	8	0.009			(Constant)	1.425	0.064			22.302 0.000
SYN 3501	0.002	-0.123	0.144	Regression	0.000	1	0.000	0.014	0.910	Session	0.002	0.016	0.041	0.117	0.910
				Residual	0.166	8	0.021			(Constant)	0.952	0.098			9.676 0.000
SYN 3502	0.289	0.200	0.095	Regression	0.029	1	0.029	3.252	0.109	Session	0.019	0.010	0.538	1.803	0.109
				Residual	0.072	8	0.009			(Constant)	0.910	0.065			14.003 0.000
SYN 3702	0.270	0.179	0.135	Regression	0.054	1	0.054	2.96	0.124	Session	0.026	0.015	0.520	1.721	0.124
				Residual	0.145	8	0.018			(Constant)	0.713	0.092			7.751 0.000
SYN 4101	0.633	0.587	0.108	Regression	0.161	1	0.161	13.8	0.006	Session	-0.044	0.012	-0.796	-3.714	0.006
				Residual	0.094	8	0.012			(Constant)	1.642	0.074			22.210 0.000
SNY 4102	0.001	-0.124	0.080	Regression	0.000	1	0.000	0.008	0.933	Session	0.001	0.009	0.031	0.087	0.933
				Residual	0.051	8	0.006			(Constant)	1.214	0.055			22.214 0.000
SYN 4502	0.142	0.034	0.147	Regression	0.029	1	0.029	1.319	0.284	Session	-0.019	0.016	-0.376	-1.148	0.284
				Residual	0.173	8	0.022			(Constant)	1.747	0.101			17.371 0.000
SYN 5402	0.213	0.114	0.119	Regression	0.031	1	0.031	2.159	0.180	Session	-0.019	0.013	-0.461	-1.469	0.180
				Residual	0.113	8	0.014			(Constant)	1.623	0.081			19.972 0.000
SYN 5903	0.549	0.492	0.139	Regression	0.187	1	0.187	9.723	0.014	Session	-0.048	0.015	-0.741	-3.118	0.014
				Residual	0.154	8	0.019			(Constant)	1.235	0.095			13.034 0.000
SYN 6001	0.771	0.742	0.065	Regression	0.115	1	0.115	26.93	0.001	Session	-0.037	0.007	-0.878	-5.189	0.001
				Residual	0.034	8	0.004			(Constant)	1.526	0.045			34.163 0.000
SYN 6002	0.116	0.005	0.151	Regression	0.024	1	0.024	1.047	0.336	Session	-0.017	0.017	-0.340	-1.023	0.336
				Residual	0.183	8	0.023			(Constant)	1.273	0.103			12.310 0.000
SYN 6003	0.434	0.363	0.117	Regression	0.084	1	0.084	6.133	0.038	Session	-0.032	0.013	-0.659	-2.476	0.038
				Residual	0.110	8	0.014			(Constant)	1.413	0.080			17.623 0.000
SYN 6101	0.002	-0.122	0.111	Regression	0.000	1	0.000	0.019	0.892	Session	-0.002	0.012	-0.049	-0.140	0.892
				Residual	0.098	8	0.012			(Constant)	0.894	0.076			11.810 0.000
SYN 6901	0.240	0.145	0.096	Regression	0.023	1	0.023	2.524	0.151	Session	-0.017	0.011	-0.490	-1.589	0.151
				Residual	0.074	8	0.009			(Constant)	1.513	0.066			23.039 0.000
SYN 6902	0.405	0.331	0.090	Regression	0.044	1	0.044	5.452	0.048	Session	0.023	0.010	0.637	2.335	0.048
				Residual	0.065	8	0.008			(Constant)	1.075	0.061			17.484 0.000
SYN 7301	0.083	-0.032	0.136	Regression	0.013	1	0.013	0.725	0.419	Session	-0.013	0.015	-0.288	-0.851	0.419
				Residual	0.148	8	0.018			(Constant)	1.226	0.093			13.202 0.000
SYN 7302	0.162	0.057	0.144	Regression	0.032	1	0.032	1.541	0.250	Session	-0.020	0.016	-0.402	-1.242	0.250
				Residual	0.167	8	0.021			(Constant)	1.209	0.099			12.255 0.000
SYN 8301	0.288	0.199	0.156	Regression	0.079	1	0.079	3.233	0.110	Session	-0.031	0.017	-0.536	-1.798	0.110
				Residual	0.195	8	0.024			(Constant)	1.491	0.107			13.973 0.000
SYN 8302	0.007	-0.117	0.137	Regression	0.001	1	0.001	0.057	0.818	Session	0.004	0.015	0.084	0.238	0.818
				Residual	0.151	8	0.019			(Constant)	1.432	0.094			15.245 0.000
SYN 8502	0.195	0.094	0.121	Regression	0.028	1	0.028	1.936	0.202	Session	0.019	0.013	0.441	1.392	0.202
				Residual	0.117	8	0.015			(Constant)	1.175	0.083			14.204 0.000
SYN 8601	0.482	0.418	0.214	Regression	0.341	1	0.341	7.453	0.026	Session	-0.064	0.024	-0.694	-2.730	0.026
				Residual	0.366	8	0.046			(Constant)	1.939	0.146			13.277 0.000
SYN 8602	0.887	0.873	0.087	Regression	0.474	1	0.474	62.92	0.000	Session	-0.076	0.010	-0.942	-7.932	0.000
				Residual	0.060	8	0.008			(Constant)	1.733	0.059			29.245 0.000

Note: Independent variable is Session. Table 5.1 indicates best linear curve fit coefficients for $N = 32$ dyads. *R square* represents the proportion of the variance for movements synchrony per dyad explained by the number of sessions as the independent variable or variables in the regression model. *Adj R-square* adjusts the statistic based on the number of independent variables in the model. *Std. Error of Est.* is the estimated standard deviation of an estimate measuring the uncertainty associated with the estimate. Standard errors are calculated from observed data. *Sum of squares* measures how far individual measurements are from the mean. *df* indicates the number of degrees of freedom of values that are free to vary and is defined as the minimum number of independent coordinates that can specify the position of the system completely. *Mean square* is the mean squared error and shows how close a regression line is to a set of points. *F* statistic is a value in ANOVA to find out if the means between two populations are significantly different. *Sig. / p-value* indicates statistical significance and refers to the claim that a result from data generated by the experimentation is not likely to occur randomly. *Unstand B* is the unstandardized beta which represents the slope of the line between movement synchrony per dyad and thenumber of sessions. Unstand. CoStE represents the average distance that the observed values deviate from the regression line. *Standardized Coef. Std. Error* represents the standard error and measures the precision of the estimate of the coefficient. *Stand. Coef. Beta* indicates estimates resulting from the regression analysis where the underlying data have been standardized so that the variances of the number of sessions and movement synchrony per dyad are equal to 1. *t* is the t-statistic which represents the ratio of the departure of the estimated value of a parameter from its hypothesized value to its standard error.

Table 5.2.

Cluster Dyads with Non-Linear Curve Fit

		Model Summary			ANOVA					Coefficients					
										Unstandardized coefficients		Standardized coefficients			
		R Square	Adj R Square	Std. Error of Est.		Sum of squares	df	Mean Square	F	Sig. / p-value		B	Coeff. St. Error	Coeff. Std. Error	Coeff. Beta	t
SYN 101	cubic	0.717	0.575	0.133	Regression	0.27	3	0.09	5.055	0.044	Session	-0.723	0.194	-10.696	-3.724	0.010
					Residual	0.107	6	0.018			Session ** 2	0.139	0.040	23.289	3.483	0.013
											Session ** 3	-0.008	0.002	-13.237	-3.282	0.017
											(Constant)	2.056	0.259		7.943	0.000
SYN 502	quadratic	0.121	-0.13	0.155	Regression	0.023	2	0.012	0.483	0.636	Session	-0.062	0.076	-1.286	-0.813	0.443
					Residual	0.168	7	0.024			Session ** 2	0.006	0.007	1.448	0.916	0.390
											(Constant)	1.485	0.182		8.142	0.000
SYN 602	cubic	0.191	-0.213	0.186	Regression	0.049	3	0.016	0.473	0.712	Session	0.314	0.271	5.622	1.159	0.291
					Residual	0.208	6	0.035			Session ** 2	-0.063	0.056	-12.751	-1.129	0.302
											Session ** 3	0.004	0.003	7.268	1.067	0.327
											(Constant)	0.974	0.361		2.698	0.036
SYN 701	cubic	0.254	-0.119	0.119	Regression	0.029	3	0.01	0.681	0.595	Session	-0.230	0.173	-6.206	-1.332	0.231
					Residual	0.085	6	0.014			Session ** 2	0.044	0.036	13.349	1.231	0.264
											Session ** 3	-0.002	0.002	-7.285	-1.114	0.308
											(Constant)	1.685	0.231		7.309	0.000
SYN 801	cubic	0.056	-0.416	0.156	Regression	0.009	3	0.003	0.119	0.946	Session	0.120	0.227	2.780	0.531	0.615
					Residual	0.146	6	0.024			Session ** 2	-0.022	0.047	-5.715	-0.468	0.656
											Session ** 3	0.001	0.003	3.016	0.410	0.696
											(Constant)	0.789	0.303		2.605	0.040
SYN 901	cubic	0.143	-0.286	0.246	Regression	0.06	3	0.02	0.333	0.802	Session	0.274	0.357	3.825	0.766	0.473
					Residual	0.362	6	0.06			Session ** 2	-0.065	0.074	-10.192	-0.877	0.414
											Session ** 3	0.004	0.004	6.571	0.937	0.385
											(Constant)	1.309	0.477		2.748	0.033
SYN 3401	quadratic	0.649	0.549	0.102	Regression	0.134	2	0.067	6.472	0.026	Session	-0.180	0.050	-3.594	-3.597	0.009
					Residual	0.073	7	0.01			Session ** 2	0.015	0.004	3.491	3.494	0.010
											(Constant)	1.739	0.120		14.513	0.000
SYN 2501	cubic	0.335	0.002	0.105	Regression	0.033	3	0.011	1.006	0.452	Session	0.224	0.152	6.467	1.470	0.192
					Residual	0.066	6	0.011			Session ** 2	-0.051	0.031	-16.486	-1.609	0.159
											Session ** 3	0.003	0.002	10.139	1.641	0.152
											(Constant)	0.884	0.203		4.350	0.005
SYN 2701	quadratic	0.454	0.298	0.062	Regression	0.023	2	0.011	2.913	0.12	Session	0.071	0.031	2.900	2.328	0.053
					Residual	0.027	7	0.004			Session ** 2	-0.007	0.003	-3.004	-2.411	0.047
											(Constant)	1.390	0.073		18.982	0.000
SYN 3002	cubic	0.304	-0.043	0.122	Regression	0.039	3	0.013	0.875	0.504	Session	-0.219	0.178	-5.552	-1.234	0.263
					Residual	0.089	6	0.015			Session ** 2	0.052	0.037	14.882	1.421	0.205
											Session ** 3	-0.003	0.002	-9.497	-1.503	0.183
											(Constant)	1.644	0.237		6.942	0.000
SYN 3201	cubic	0.081	-0.379	0.145	Regression	0.011	3	0.004	0.176	0.909	Session	0.146	0.211	3.590	0.694	0.513
					Residual	0.126	6	0.021			Session ** 2	-0.031	0.043	-8.675	-0.720	0.498
											Session ** 3	0.002	0.003	5.201	0.716	0.501
											(Constant)	1.116	0.281		3.971	0.007
SYN 3701	cubic	0.578	0.367	0.161	Regression	0.212	3	0.071	2.739	0.136	Session	0.338	0.234	5.066	1.446	0.198
					Residual	0.155	6	0.026			Session ** 2	-0.092	0.048	-15.555	-1.906	0.105
											Session ** 3	0.006	0.003	10.503	2.134	0.077
											(Constant)	0.560	0.312		1.796	0.123
SYN 4501	quadratic	0.698	0.612	0.256	Regression	1062	2	0.531	8.106	0.015	Session	-0.184	0.126	-1.356	-1.465	0.186
					Residual	0.459	7	0.066			Session ** 2	0.025	0.011	2.100	2.268	0.058
											(Constant)	1.534	0.301		5.096	0.001
SYN 4601	quadratic	0.503	0.361	0.107	Regression	0.08	2	0.04	3.537	0.087	Session	-0.110	0.052	-2.491	-2.094	0.075
					Residual	0.08	7	0.011			Session ** 2	0.011	0.005	2.864	2.408	0.047
											(Constant)	1.588	0.125		12.667	0.000
SYN 4602	cubic	0.528	0.291	0.145	Regression	0.141	3	0.047	2.233	0.185	Session	-0.130	0.211	-2.289	-0.617	0.560
					Residual	0.126	6	0.021			Session ** 2	0.049	0.043	9.633	1.116	0.307
											Session ** 3	-0.004	0.003	-7.416	-1.424	0.204
											(Constant)	0.971	0.281		3.451	0.014
SNY 4701	quadratic	0.583	0.464	0.103	Regression	0.103	2	0.051	4.888	0.047	Session	-0.140	0.050	-3.018	-2.771	0.028
					Residual	0.074	7	0.011			Session ** 2	0.011	0.004	2.588	2.376	0.049
											(Constant)	1.683	0.121		13.953	0.000
SYN 4702	cubic	0.222	-0.166	0.185	Regression	0.058	3	0.019	0.572	0.654	Session	-0.319	0.269	-5.644	-1.186	0.280
					Residual	0.205	6	0.034			Session ** 2	0.060	0.055	12.002	1.084	0.320
											Session ** 3	-0.003	0.003	-6.753	-1.011	0.351
											(Constant)	1.772	0.358		4.945	0.003
SYN 4802	quadratic	0.253	0.039	0.056	Regression	0.007	2	0.004	1.184	0.361	Session	-0.042	0.028	-2.231	-1.531	0.170
					Residual	0.022	7	0.003			Session ** 2	0.004	0.002	2.226	1.527	0.171
											(Constant)	1.201	0.066		18.143	0.000
SYN 5401	quadratic	0.585	0.467	0.108	Regression	0.115	2	0.058	4.938	0.046	Session	0.136	0.053	2.787	2.566	0.037
					Residual	0.082	7	0.012			Session ** 2	-0.010	0.005	-2.274	-2.094	0.075
											(Constant)	1.065	0.127		8.387	0.000
SYN 5501	quadratic	0.371	0.191	0.097	Regression	0.039	2	0.02	2.065	0.197	Session	-0.094	0.048	-2.630	-1.966	0.090
					Residual	0.066	7	0.009			Session ** 2	0.009	0.004	2.717	2.031	0.082
											(Constant)	1.215	0.114		10.624	0.000
SYN 5502	cubic	0.577	0.365	0.098	Regression	0.079	3	0.026	2.724	0.137	Session	-0.326	0.143	-7.989	-2.276	0.063
					Residual	0.058	6	0.01			Session ** 2	0.056	0.030	15.372	1.881	0.109
											Session ** 3	-0.003	0.002	-7.836	-1.590	0.163
											(Constant)	1.547	0.191		8.100	0.000
SYN 5902	quadratic	0.212	-0.014	0.129	Regression	0.031	2	0.016	0.939	0.435	Session	-0.083	0.063	-1.959	-1.308	0.232
					Residual	0.116	7	0.017			Session ** 2	0.008	0.006	2.046	1.366	0.214
											(Constant)	1.241	0.151		8.207	0.000
SYN 6501	quadratic	0.382	0.205	0.158	Regression	0.109	2	0.054	2.163	0.186	Session	-0.143	0.078	-2.437	-1.839	0.109
					Residual	0.176	7	0.025			Session ** 2	0.011	0.007	2.086	1.574	0.160
											(Constant)	1.808	0.186		9.703	0.000
SYN 7602	quadratic	0.537	0.405	0.049	Regression	0.02	2	0.01	4.062	0.067	Session	0.045	0.024	2.126	1.853	0.106
					Residual	0.017	7	0.002			Session ** 2	-0.005	0.002	-2.629	-2.291	0.056
											(Constant)	1.023	0.058		17.633	0.000
SYN 8901	cubic	0.654	0.481	0.119	Regression	0.16	3	0.053	3.776	0.078	Session	0.292	0.173	5.352	1.686	0.143
					Residual	0.085	6	0.014			Session ** 2	-0.071	0.036	-14.657	-1.983	0.095
											Session ** 3	0.005	0.002	10.080	2.261	0.064
											(Constant)	1.139	0.231		4.933	0.003
SYN 9001	quadratic	0.211	-0.014	0.166	Regression	0.052	2	0.026	0.937	0.436	Session	0.105	0.082	1.934	1.291	0.238
					Residual	0.193	7	0.028			Session ** 2	-0.010	0.007	-2.037	-1.360	0.216
											(Constant)	1.016	0.195		5.198	0.001
SYN 9403	cubic	0.148	-0.277	0.098	Regression	0.01	3	0.003	0.349	0.792	Session	-0.111	0.143	-3.859	-0.775	0.468
					Residual	0.058	6	0.01			Session ** 2	0.025	0.029	9.950	0.859	0.424
											Session ** 3	-0.002	0.002	-6.068	-0.868	0.419
											(Constant)	1.088	0.190		5.722	0.001

Note: Independent variable is Session. Table 5.2 indicates best linear curve fit coefficients for $N = 27$ dyads. *R square* represents the proportion of the variance for movements synchrony per dyad explained by the number of sessions as the independent variable or variables in the regression model. *Adj R-square* adjusts the statistic based on the number of independent variables in the model. *Std. Error of Est.* is the estimated standard deviation of an estimate measuring the uncertainty associated with the estimate. *Standard errors* are calculated from observed data. *Sum of squares* measures how far individual measurements are from the mean. *df* indicates the number of degrees of freedom of values that are free to vary and is defined as the minimum number of independent coordinates that can specify the position of the system completely. *Mean square* is the mean squared error and shows how close a regression line is to a set of points. *F* statistic is a value in ANOVA to find out if the means between two populations are significantly different. *Sig. / p-value* indicates statistical significance and refers to the claim that a result from data generated by the experimentation is not likely to occur randomly. *Unstand B* is the unstandardized beta which represents the slope of the line between movement synchrony per dyad and thenumber of sessions. *Unstand. CoStE* represents the average distance that the observed values deviate from the regression line. *Standardized Coef. Std. Error* represents the standard error and measures the precision of the estimate of the coefficient. *Stand. Coef. Beta* indicates estimates resulting from the regression analysis where the underlying data have been standardized so that the variances of the number of sessions and movement synchrony per dyad are equal to 1. *t* is the t-statistic which represents the ratio of the departure of the estimated value of a parameter from its hypothesized value to its standard error.

Table 5.3 depicts the mean best curve fit estimation value for all the dyads in the cluster identified with the best 'linear' curve fit (n =32), as well as for all the dyads in the cluster identified with the best 'cubic' curve fit (n = 14) and 'quadratic' curve fit (n = 13).

Table 5.3.

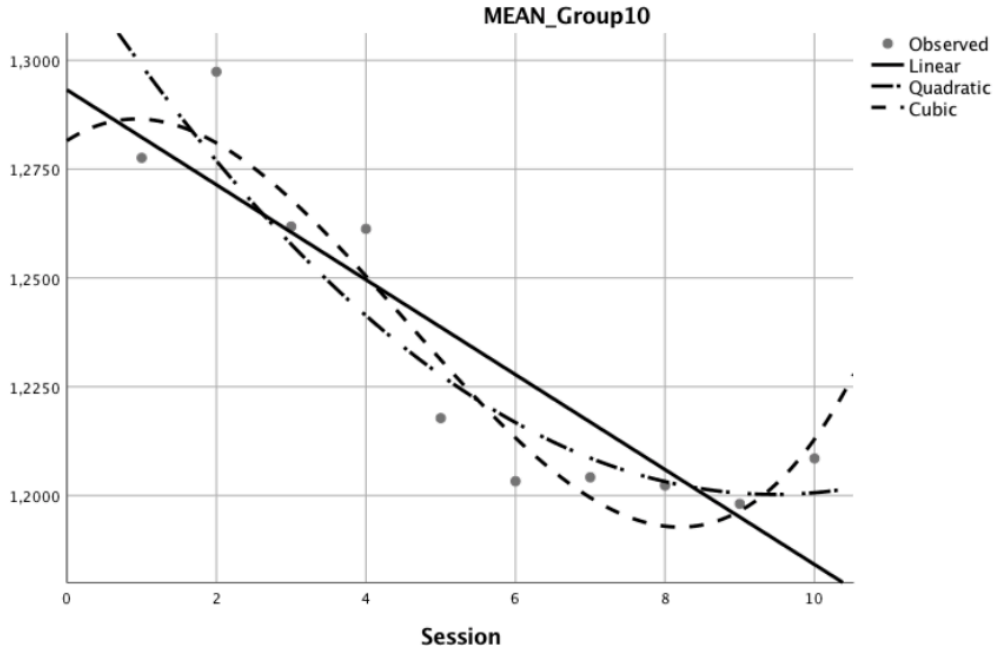
Mean Linear and Non-Linear Curve Fit - Dyads with 10 Sessions

Model Summary				ANOVA					Coefficients					
									Unstandardized coefficients		Standardized coefficients			
Curve	R Square	Adj R Square	Std. Error of Est.		Sum of squares	df	Mean Square	F	Sig. / p-value		B	Coeff. St. Error	Beta	t	Sig.
linear	0.320	0.219	0.119	Regression	0.104	1	0.104	8.098	0.286	Session	-0.021	0.014	-0.333	-1.613	0.286
				Residual	0.143	8	0.018			(Constant)	1.341	0.087		16.834	0.000
quadratic	0.428	0.264	0.119	Regression	0.138	2	0.069	3.284	0.205	Session	-0.052	0.059	-0.866	-0.719	0.137
				Residual	0.119	7	0.017			Session ** 2	0.005	0.005	0.894	0.754	0.121
										(Constant)	1.384	0.140		11.634	0.000
cubic	0.342	0.013	0.144	Regression	0.083	3	0.028	1.508	0.496	Session	-0.025	0.210	-0.681	-0.242	0.307
				Residual	0.134	6	0.022			Session **2	0.002	0.043	1.032	0.170	0.277
										Session **3	0.000	0.003	-0.380	-0.116	0,275
										(Constant)	1.252	0.280		4.822	0.019

Note: Mean curve fit for linear, cubic and quadratic curves for dyads with 10 sessions. *R square* represents the proportion of the variance for movements synchrony per dyad explained by the number of sessions as the independent variable in the regression model. *Adj R-square* adjusts the statistic based on the number of independent variables in the model. *Std. Error of Est.* is the estimated standard deviation of an estimate measuring the uncertainty associated with the estimate. Standard errors are calculated from observed data. *Sum of squares* measures how far individual measurements are from the mean. *df* indicates the number of degrees of freedom of values that are free to vary and is defined as the minimum number of independent coordinates that can specify the position of the system completely. *Mean square* is the mean squared error and shows how close a regression line is to a set of points. *F* statistic is a value in ANOVA to find out if the means between two populations are significantly different. *Sig. / p-value* indicates statistical significance and refers to the claim that a result from data generated by the experimentation is not likely to occur randomly. *Unstand B* is the unstandardized beta which represents the slope of the line between movement synchrony per dyad and thenumber of sessions. *Unstand. CoStE* represents the average distance that the observed values deviate from the regression line. *Standardized Coef. Std. Error* represents the standard error and measures the precision of the estimate of the coefficient. *Stand. Coef. Beta* indicates estimates resulting from the regression analysis where the underlying data have been standardized so that the variances of the number of sessions and movement synchrony per dyad are equal to 1. *t* is the t-statistic which represents the ratio of the departure of the estimated value of a parameter from its hypothesized value to its standard error.

Figure 5.2 depicts the graphical representation of the best curve fit in relation to mean movement synchrony for each of the three curve types (linear, cubic and quadratic) after curve type reduction comprising dyads that completed 10 session (N = 59).

Figure 5.2.



Note. Reduced Best Fitting Curves for Mean Synchrony of dyads (N = 59) that completed 10 coaching sessions represented in linear, quadratic and cubic curves.

Correspondingly, Table 5.4 details the correlation coefficients for these three best fitting curves in relation to mean movement synchrony comprising the same number of dyadic interactions. Overall, the 'linear decrease' curve type (n = 24) is the most frequently represented pattern of change of movement synchrony in the data sample (N = 59) analyzed for the group of dyads that completed 10 coaching sessions but not the best fit for the mean change in movement synchrony. The 'cubic' curve type is the one that best explains mean variance in movement synchrony (R^2 = 0.987) by the number of sessions for this data sample (Table 5.4).

Table 5.4.

Best Fit Curves for Mean Synchrony - Dyads with 10 Sessions

Model Summary				ANOVA					Coefficients					
									Unstandardized coefficients			Standardized coefficients		
Curve	R Square	Adj R Square	Std. Error of Est.		Sum of squares	df	Mean Square	F	Sig. / p-value		B	Coeff. St. Error	Beta	t	Sig.
linear	0.787	0.761	0.018	Regression	0.010	9	0.010	29.633	0.001	Session	-0.011	0.002	-0.887	-5.444	0.001
				Residual	0.003		0.000			(Constant)	1.293	0.012		104.007	0.000
				Total	0.012										
quadratic	0.867	0.830	0.015	Regression	0.011	9	0.005	22.913	0.001	Session	-0.026	0.008	-2.118	-3.450	0.011
				Residual	0.002		0.000			Session ** 2	0.001	0.001	1.262	2.057	0.079
				Total	0.01					(Constant)	1.323	0.018		73.246	0.000
cubic	0.927	0.890	0.012	Regression	0.012	9	0.004	25.267	0.001	Session	0.011	0.018	0.907	0.621	0.557
				Residual	0.001		0.000			Session **2	-0.007	0.004	-6.141	-1.805	0.121
				Total	0.012					Session **3	0.000	0.000	4.513	2.200	0.070
										(Constant)	1.282	.024		53.486	0.000

Note: Mean curve fit for linear, quadratic and cubic curves for movement synchrony comprising dyads with 10 sessions. *R square* represents the proportion of the variance for movements synchrony per dyad explained by the number of sessions as the independent variable in the regression model. *Adj R-square* adjusts the statistic based on the number of independent variables in the model. *Std. Error of Est.* is the estimated standard deviation of an estimate measuring the uncertainty associated with the estimate. Standard errors are calculated from observed data. *Sum of squares* measures how far individual measurements are from the mean. *df* indicates the number of degrees of freedom of values that are free to vary and is defined as the minimum number of independent coordinates that can specify the position of the system completely. *Mean square* is the mean squared error and shows how close a regression line is to a set of points. *F* statistic is a value in ANOVA to find out if the means between two populations are significantly different. *Sig. / p-value* indicates statistical significance and refers to the claim that a result from data generated by the experimentation is not likely to occur randomly. *Unstand B* is the unstandardized beta which represents the slope of the line between movement synchrony per dyad and themumber of sessions. *Unstand. CoStE* represents the average distance that the observed values deviate from the regression line. *Standardized Coef. Std. Error* represents the standard error and measures the precision of the estimate of the coefficient. *Stand. Coef. Beta* indicates estimates resulting from the regression analysis where the underlying data have been standardized so that the variances of the number of sessions and movement synchrony per dyad are equal to 1. *t* is the t-statistic which represents the ratio of the departure of the estimated value of a parameter from its hypothesized value to its standard error.

5.5.2.2 Best fitting curves for 173 dyadic interactions

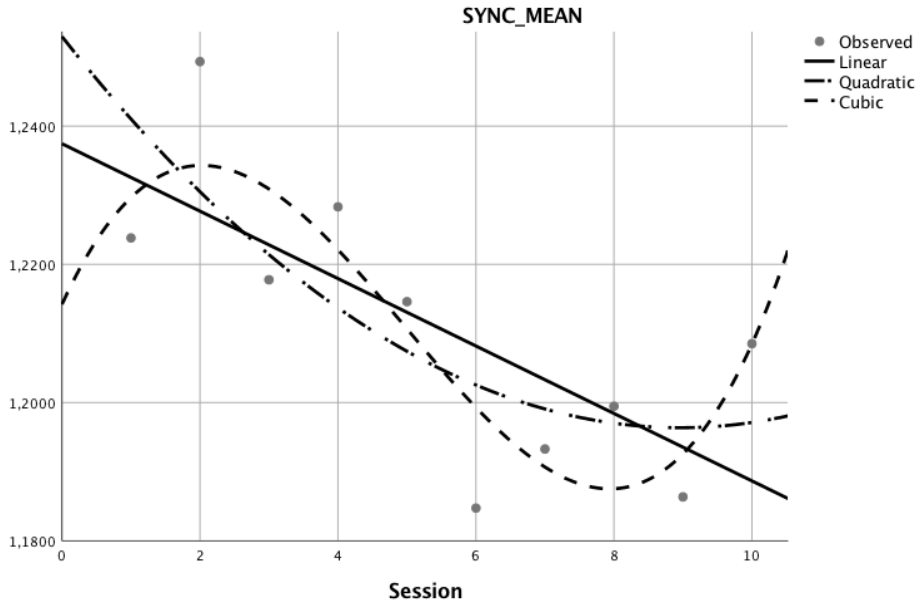
Table 5.5[6] shows the entire set of best curve fit estimation values for all the dyads (n = 79) in the cluster identified with the best 'linear' (decrease, increase, or constant) curve fit. Following computational steps in 5.5.2.1, the predictive value of this best curve fit was determined using the parameter estimates R^2-ed / F / p-value for significant. Subsequent visual inspection of the curve plot confirmed the best fitting curve. Table 5.6[7] shows the entire set of best curve fit estimation values for all the dyads (n =94) in the cluster identified with the best 'cubic' (n = 48) and 'quadratic' (n = 46) curve fit. Table 5.7[8] depicts the mean best curve fit estimation

[6] Appendix Table 5.5. Entire set of best curve fit estimation values for dyads with the best 'linear' curve fit
[7] Appendix Table 5.6. Entire set of best curve fit estimation values for dyads with the best 'cubic' and 'quadratic' curve fit
[8] Appendix Table 5.7. Mean best curve fit estimation values for all dyads with the best 'linear', 'cubic', and 'quadratic' curve fit

values for all the dyads in the cluster identified with the best 'linear' curve fit, as well as for all the dyads in the cluster identified with the best 'cubic' curve fit and 'quadratic' curve fit.

Figure 5.3 depicts the graphical representation of the mean best curve fit in relation to movement synchrony for each of the three curve types (linear, cubic and quadratic) after curve type reduction comprising $N = 173$ dyadic interactions, that is including dyads that completed only 5 sessions, to name but one example. Correspondingly, Table 5.8 details the correlation coefficients for these three best fitting curves in relation to mean movement synchrony comprising the same number of dyadic interactions.

Figure 5.3.



Note. Reduced Best Fitting Curves for Mean Synchrony of all 173 dyadic interactions represented in linear, quadratic and cubic curves.

Overall, the 'linear decrease' curve type ($n = 52$) is the most frequently represented pattern of change of movement synchrony in the data sample ($N = 173$) but not the best fit for the mean change in movement synchrony. The 'cubic' curve type is the one that best explains mean variance in movement synchrony ($R^2 = 0.763$) by the number of sessions for this data sample (Table 5.8).

Table 5.8.

Best Fit Curves for Mean Synchrony - 173 Dyadic Interactions

Model Summary				ANOVA					Coefficients					
									Unstandardized coefficients		Standardized coefficients			
Curve	R Square	Adj R Square	Std. Error of Est.		Sum of squares	df	Mean Square	F	Sig. / p-value		B	Coeff. St. Error	Beta	t	Sig.
linear	0.525	0.465	0.015	Regression	0.002	1	0.002	8.837	0.018	Session	-0.005	0.002	-0.724	-2.973	0.018
				Residual	0.002	8	0.000			(Constant)	1.237	0.010		121.525	0.000
				Total	0.004	9									
quadratic	0.595	0.479	0.015	Regression	0.002	2	0.001	5.141	0.042	Session	-0.013	0.007	-1,876	-1.748	0.124
				Residual	0.002	7	0.000			Session ** 2	0.001	0.001	1.181	1.101	0.307
				Total	0.004	9				(Constant)	1.253	0.017		72.408	0.000
cubic	0.763	0.645	0.012	Regression	0.003	3	0.001	6.448	0.026	Session	0.022	0.018	3.226	0.229	0.265
				Residual	0.001	6	0.000			Session **2	-0.007	0.004	-11.304	-1.850	0.114
				Total	0.004	9				Session **3	0.000	0.000	7.611	2.065	0.084
										(Constant)	1.214	.024		51.494	0.000

Note: Mean curve fit for linear, quadratic and cubic curves for movement synchrony comprising 173 dyadic interactions. *R square* represents the proportion of the variance for movements synchrony per dyad explained by the number of sessions as the independent variable in the regression model. *Adj R-square* adjusts the statistic based on the number of independent variables in the model. *Std. Error of Est.* is the estimated standard deviation of an estimate measuring the uncertainty associated with the estimate. Standard errors are calculated from observed data. *Sum of squares* measures how far individual measurements are from the mean. *df* indicates the number of degrees of freedom of values that are free to vary and is defined as the minimum number of independent coordinates that can specify the position of the system completely. *Mean square* is the mean squared error and shows how close a regression line is to a set of points. *F* statistic is a value in ANOVA to find out if the means between two populations are significantly different. *Sig. / p-value* indicates statistical significance and refers to the claim that a result from data generated by the experimentation is not likely to occur randomly. *Unstand B* is the unstandardized beta which represents the slope of the line between movement synchrony per dyad and thenumber of sessions. *Unstand. CoStE* represents the average distance that the observed values deviate from the regression line. *Standardized Coef. Std. Error* represents the standard error and measures the precision of the estimate of the coefficient. *Stand. Coef. Beta* indicates estimates resulting from the regression analysis where the underlying data have been standardized so that the variances of the number of sessions and movement synchrony per dyad are equal to 1. *t* is the t-statistic which represents the ratio of the departure of the estimated value of a parameter from its hypothesized value to its standard error.

5.5.2.3 Correlation analysis

The standard cross-correlation analysis was run for the dataset of $N = 173$ dyadic interactions to identify associations between best curve types per dyad with either linear, quadratic or cubic best curve fit parameter estimations. Curve types from curve estimates were correlated to demographical data from questionnaires using SPSS Correlation Function. Curve types for the cross-correlation computation were coded as nominal values as follows: -1 = linear decrease, 0 = linear constant (b1 within 0,003 and -0,003), 1 = linear increase, 2 = quadratic, 3 = cubic. The cross-correlation analysis was repeated by applying a shuffled curve type coding (0 = linear decrease, 2 = constant, -1 = linear increase, 3 = cubic, 1 = quadratic), which resulted in the Pearson correlation (r) value changing by less than 0.1. This shuffled curve type coding did not alter the significance levels of computed correlations. The cross-correlation analysis showed that the pattern of change in movement synchrony does not correlate with any of the five descriptive variables (i.e., demographics such as client age, client / coach gender, coach's years of experience, number of sessions) collected in the dataset. This cross-correlation computation indicates that the pattern of development of movement synchrony across dyads and over time is unrelated to these variables but for one exception (Table 5.9). Client age and coach's years of experience were found to have a small but significant correlation ($r = .18$, $p = .02$).

Furthermore, the standard correlation analysis for of mean levels of movement synchrony and number of sessions $N = 173$ dyads showed no significant effects ($r = .02$; 2-tailed $p = .762$).

Table 5.9.

Variable	Coeffiecient	*N*	*Mean*	*SD*	1	2	3	4	5	6
1. Curve type	*r*	173	1.20	1.60	1					
	Sig. (2-tailed)									
2 Coach experience	*r*	173	5.00	2.74	.01	1				
	Sig. (2-tailed)				.86					
3 Number of sessions	*r*	173	7.67	2.60	-.03	-.03	1			
	Sig. (2-tailed)				.72	.68				
4 Gender Coach	*r*	173	1.83	0.38	.02	.03	.05	1		
	Sig. (2-tailed)				.81	.71	.51			
5 Gender Client	*r*	173	1.65	0.48	-.03	.02	.04	.09	1	
	Sig. (2-tailed)				.71	.80	.63	.24		
6 Client Age	*r*	172	41.66	10.50	.04	.18*	.08	.10	-.12	1
	Sig. (2-tailed)				.57	.02	.27	.19	.13	

Note. Correlation coefficients for descriptive variables. $N = 173$, one client did not fill in the questionnaire corectly in terms of his/her age. Therefore $N = 172$ for Client Age. *SD* indicates the standard deviation and measures the dispersion of the given set of data from its *Mean* . *r (Pearson correlation)* measures the statistical correlation between two continuous variables and indicates the magnitude of the correlation as well as the direction of the association between two variables. *Sig (2-tailed)* indicates the *p* -value evaluating the null against an alternative that the mean is not equal to 50. The *p* -value associated with the t-test is not small ($p > 0.05$), and the null hypothesis is not rejected. We can conclude that the mean is not different from the hypothesized value.

*. Correlation is significant at the 0.05 level (2-tailed)

* $p < .05$

5.5.2.4 Multiple discriminant analysis

The objective of running a multiple discriminant analysis was to interpret the predictive equation between the best fitting curve types as dependent variables and demographic variables (see correlation analysis in 5.5.2.3 above) as independent variables to better understand the correlations between these variables or identify new covariances that may exist among these variables (Grimm & Yarnold, 1995). Multiple discriminant analysis starts with a discrete dependent variable (curve type) and attempts to determine the extent to which the levels of the independent variables distinguish the coaching dyads as 'members' of the curve type 'groups' (linear, quadratic, cubic). Specifically, we examined the suitability of client gender, coach

gender, client age, number of sessions and coach's years of experience as demographic predictor variables for the development of movement synchrony over the course of coaching sessions, as expressed in the measured best fitting curve type (linear decrease, linear constant, linear increase, quadratic or cubic). The dataset was checked for suitability to run the discriminant analysis. Neither of the demographic variables showed strong correlations among each other as reported in the correlation analysis in 5.5.2.3 of this Chapter. Therefore, demographic variables are not considered to be multicollinear.

Conclusively, running the discriminant analysis to predict group membership of curve types and demographic variables comprised using a set of discriminant functions based on linear combinations of the predictor variables to provide the best discrimination between the groups. The functions were generated from the sample of cases for which group membership was known with N=172 as one case had to be excluded for invalid data. Table 5.10 reports the resulting group statistics and covariance matrices. The matrices report coefficients for independent variables as a within-groups covariance matrix, separate-groups covariance matrix, and total covariance matrix. The within-groups covariance matrix is obtained by averaging the separate covariance matrices for all groups and may differ from the total covariance matrix. The between-group covariance matrix displays covariance values for each group, while the total covariance matrix reports all cases as if they were from a single sample.

Table 5.10.

		Covariance Matrices[a]					Group Statistics		
Curve Type	Variable	1	2	3	4	5	*Mean*	*SD*	*N (listwise)*
-1	1 Gender Coach	0.13	0.03	0.64	0	-0.08	1.84	0.37	51
	2 Gender Client	0.03	0.23	-0.86	0	0.15	1.67	0.48	51
	3 Client Age	0.64	-0.86	120	1.64	1.94	41	10.95	51
	4 Coach Experience	0	0	1.64	0.35	-0.16	1.65	0.59	51
	5 Number of sesssions	-0.08	0.15	1.94	-0.16	8.33	7.90	2.89	51
0	1 Gender Coach	0	0	0	0	0	2	0	5
	2 Gender Client	0	0.30	-0.50	-0.30	0.10	1.60	0.55	5
	3 Client Age	0	-0.50	215	0.50	2	44	14.66	5
	4 Coach Experience	0	-0.30	0.50	0.30	-0.10	1.40	0.55	5
	5 Number of sesssions	0	0.10	2.00	-0.10	1.20	9.20	1.10	5
1	1 Gender Coach	0.22	0.01	1.58	-0.06	0.24	1.70	0.47	23
	2 Gender Client	0.01	0.25	-0.49	0.02	0.33	1.61	0.50	23
	3 Client Age	1.58	-0.49	104.77	1.49	0.02	40.70	10.24	23
	4 Coach Experience	-0.06	0.02	1.49	0.34	-0.20	1.39	0.58	23
	5 Number of sesssions	0.24	0.33	0.02	-0.20	10.44	6.48	3.23	23
2	1 Gender Coach	0.15	0.03	0.02	0.03	0.11	1.82	0.39	45
	2 Gender Client	0.03	0.22	0.48	-0.01	-0.08	1.69	0.47	45
	3 Client Age	0.02	0.48	102.40	0.36	7.20	42.09	10.12	45
	4 Coach Experience	0.03	-0.01	0.36	0.39	-0.04	1.56	0.62	45
	5 Number of sesssions	0.11	-0.08	7.20	-0.04	5.42	7.76	2.33	45
3	1 Gender Coach	0.11	-0.01	-0.13	0	-0.07	1.88	0.33	48
	2 Gender Client	-0.01	0.24	-1.37	0.04	-0.10	1.60	0.49	48
	3 Client Age	-0.13	-1.37	108.11	1.27	-1.48	42.19	10.40	48
	4 Coach Experience	0	0.04	1.27	0.35	0.03	1.69	0.59	48
	5 Number of sesssions	-0.07	-0.10	-1.48	0.03	4.87	7.75	2.21	48
Total	1 Gender Coach	0.14	0.02	0.39	0.01	0.05	1.83	0.38	172
	2 Gender Client	0.02	0.23	-0.58	0.01	0.05	1.65	0.48	172
	3 Client Age	0.39	-0.58	110.2	1.14	2.30	41.66	10.50	172
	4 Coach Experience	0.01	0.01	1.14	0.36	-0.05	1.59	0.60	172
	5 Number of sesssions	0.05	0.05	2.30	-0.05	6.82	7.67	2.61	172

Note. Group statistics summarizing valid and excluded cases (*N*) per curve type. All except for one observation in the dataset are valid (N = 172 out of N = 173). Group statistics includes *Mean* and *SD* (Standard Deviation) values. The groups' *Means* on the predictor variables report if predictor variables discrimate among groups indicating how the groups are different on those variables. *SD* indicates the spread of data measuring how far each observed value is from the *Mean*. About 95% of values will be within 2 *Standard Deviations* of the *Mean*. *Covariance Matrices* indicate the direction of the linear relationship between variables showing when two variables vary with each other while correlation indicates when the change in one variable results in the change in another variable. Correlation is a function of the covariance (see 5.5.2.3). Where variables are independent, the covariance is 0.

a. The total covariance matrix has 171 degrees of freedom.

The Box's M test (also referred to as Box's Test for Equivalence of Covariance Matrices) was run to check for the equality of the group covariance matrices. In effect, it tests if two or more covariance matrices are equal (homogeneous). For sufficiently large samples, a nonsignificant *p* value means that there is insufficient evidence that the matrices differ. For our data set, the Box's M test indicates that the matrix for the 'linear constant' curve type is singular. This can be explained by the fact that the linear constant curve type represents the smallest curve type group ($n = 5$) and thus equals the number of predictor variables. Therefore the 'linear

constant' group singular covariance matrix could not be inverted for the test and has been instead tested against their own pooled within-groups covariance matrix.

Methodically, the Standardized Canonical Discriminant Function Coefficients were used to calculate the discriminant score for a given case. The score is computed in SPSS in the same manner as a predicted value from a linear regression, using the standardized coefficients and the standardized variables. For example, zClientAge, zCoachGender, zClientGender, zCoachExperience, and zNumberOfSessions as variables were created by standardizing the discriminating variables. Then, for each case, the function scores were calculated using the discriminant functions, as shown in the following equation:

$$D = C_0 * X_0 + C_1 X_1 + C_2 * X_2 + C_3 X_3 + C_4 * X_4$$

with D representing the discriminant variable, C_x representing the discriminant coefficient and X_n representing the independent variables.

The distribution of the scores from each function were standardized to have a mean of zero and standard deviation of one. The magnitudes of these coefficients indicate how strongly the discriminating variables effect the score. The calculated Canonical Discriminant Functions such as Eigenvalue, Wilk's Lambda and Standardized Canonical Discrimination Function Coefficients are shown in Table 5.11.

Table 5.11.

	Eigenvalues				Standardized Canonical Discriminant Function Coefficients						Wilk's Lambda			
Function	*Eigenvalue*	*% Variance*	*Cumul. %*	*Canon. Corr.*	*Gender Coach*	*Gender Client*	*Client Age*	*Coach Exp.*	*No of sessions*	Test of functions	*Wilk's Lambda*	*Chi-square*	*df*	*Sig.*
1	.08[a]	74.9	74.9	0.28	0.56	-0.06	-0.07	0.50	0.70	1 through 4	0.90	18.02	20	0.59
2	.02[a]	16.3	91.2	0.13	0.13	0.15	0.38	-0.85	0.39	2 through 4	0.97	4.63	12	0.97
3	.01[a]	7	98.3	0.09	-0.42	0.83	-0.23	0.12	0.28	3 through 4	0.99	1.63	6	0.95
4	.00[a]	1.7	100	0.04	-0.04	0.41	0.89	0.17	-0.28	4	1.00	0.32	2	0.85

Note. Summary of Canonical Discriminant Functions. Function indicates the first four canonical linear discriminant functions, which is 1 fewer than the number of levels in the group variable. For the five discriminating variables used, there are four functions calculated. Each function acts as projection of the data onto a dimension that best separates or discriminates between the groups. *Eigenvalue* comprises the eigenvalues of the matrix product of the inverse of the within-group sums-of-squares and cross-product matrix and the between-groups sums-of-squares and cross-product matrix. Eigenvalues are related to the canonical correlations and describe how much discriminating ability a function possesses. The magnitudes of the eigenvalues are indicative of the functions' discriminating abilities. *% Variance* is the proportion of discriminating ability of the five continuous variables found in a given function. It is calculated as the proportion of the function's eigenvalue to the sum of all the eigenvalues. In this analysis, the first function accounts for 74.9% of the discriminating ability of the discriminating variables, etc. *Cumul.%* is the cumulative proportion of discriminating ability. For any analysis, the proportions of discriminating ability will sum to one. Thus, the last entry in the cumulative column will also be one. *Canon.Corr.* are the canonical correlations of the predictor variables (Gender Coach, Gender Client, Client Age, Coach Experience, Number of Sessions) and the groupings in curve types. If the discriminating variables are considered as one set of variables and the set of dummies generated from the grouping variable is considered another set of variables, a canonical correlation analysis on these two sets can be performed. This analysis results in the canonical correlations. *Test of functions* are the functions included in a given test with the null hypothesis that the canonical correlations associated with the functions are all equal to zero. As there are four functions, the first test presented in the table tests both canonical correlations (1 through 2), the second test presented tests the second canonical correlations (2 through 4) alone, etc. *Wilks' Lambda* is one of the multivariate statistic calculated by SPSS. It is the product of the values of (1- canonical correlation 2). The canonical correlations are 0.28 and 0.04, so the Wilks' Lambda testing both canonical correlations is (1- 0.28)*(1-0.04) = 0.90, etc. *Chi-squre* is the Chi-square statistic testing that the canonical correlation of the given function is equal to zero.The null hypothesis is that the function, and all functions that follow, have no discriminating ability. This hypothesis is tested using this Chi-square statistic. *df* is the effect degrees of freedom for the given function. It is based on the number of groups present in the categorical variable and the number of continuous discriminant variables. The Chi-square statistic is compared to a Chi-square distribution with the degrees of freedom stated in the table. *Sig.* is the *p*-value associated with the Chi-square statistic of a given test. The null hypothesis that a given function's canonical correlation and all smaller canonical correlations are equal to zero is evaluated with regard to this *p*-value. For a given alpha level, such as 0.05, if the *p*-value is lown than alpha, the null hypothesis is rejected. If not, then

a. First 4 canonical discriminant functions were used in the analysis.

Finally, Table 5.12 shows the Classification Results as the classification processing summary. In this table, "processed" cases are those that were successfully classified based on the analysis. The reasons why an observation may not have been processed are listed in Table 5.12.

Table 5.12.

			Predicted Group Membership					
		Curve Type	-1	0	1	2	3	Total
Original[a]	Count	-1	6	16	14	3	12	51
		0	0	4	0	0	1	5
		1	3	7	10	3	0	23
		2	6	14	14	4	7	45
		3	7	13	9	6	13	48
	%	-1	11.8	33.4	27.5	5.9	23.5	100
		0	.0	80	.0	.0	20	100
		1	13	30.4	43.5	13	.0	100
		2	13.3	31.1	31.3	8.9	15.6	100
		3	14.6	27.1	18.8	12.5	27.1	100
Cross-validated[b]	Count	-1	4	17	14	3	13	51
		0	1	0	0	2	2	5
		1	3	8	7	2	3	23
		2	6	15	16	0	8	45
		3	12	13	10	7	6	48
	%	-1	7.8	33.3	27.5	5.9	25.5	100
		0	20	.0	.0	40	40	100
		1	13	34.8	30.4	8.7	13	100
		2	13.3	33.3	35.6	.0	17.8	100
		3	25	27.1	20.8	14.6	12.5	100

Note. Classification Processing Summary. In this table, "processed" cases are those that were successfully classified based on the analysis. It indicates that the observations in the dataset were not successfully classified. *Predicted Group Membership* indicates the predicted frequencies of groups from the analysis. The numbers going down each column indicate how many were correctly and incorrectly classified. For example, of the 22 cases that were predicted to be in the linear decrease group, 6 were correctly predicted, and 16 were incorrectly predicted (3 cases were in the linear increase group, 6 cases were in the quadratic group, 7 cases were in the cubic group). *Original* represent the frequencies of groups found in the data. The *Totals* show that 51 cases fall into the linear decrease group, 5 fall into the linear constant group, 23 fall into the linear increase group, etc. Across each row, we see how many of the cases in the group are classified by the analysis into each of the different groups. For example, of the 51 cases that are in the linear decrease group, 6 were predicted correctly and 45 were predicted incorrectly. *Count* presents the number of observations falling into the given intersection of original and predicted group membership. For example, the number of observations originally in the linear decrease group, but predicted to fall into the linear constant group is 16. The row totals of these counts are presented, but column totals are not. *%* presents the percent of observations originally in a given group (listed in the rows) predicted to be in a given group (listed in the columns). For example, the percent of observations in the linear increase group that were predicted to be in the cubic group is 0%. *Cross-validation* is a resampling method to estimate test error to assess the reliability and generalisability of the findings. Cross-validation is a widely approach when an external validation set is not available.

[a]21.5% of original grouped cases correctly classified.

[b]Cross-validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

In sum, the results of the multiple discriminant analysis reported in Chapter 5 do not indicate that the demographic variables predict best fitting curve types. Curve types did not systematically differ in correlation with either coach / client gender, client age, coach experience, or number of sessions. In other words, movement synchrony patterns in same-gender dyads did not show a linear increase and movement synchrony patterns in different-gender dyads did not show a linear decrease.

5.6 Discussion

The aim of Chapter 5 was to point to the potential importance of exploring the development of movement synchrony as a time-series measure in how we can further conceptualize and research movement synchrony in coaching as an interactional change process in the future. We were also curious how we can potentially work with movement synchrony as an interactional phenomenon in coaching as a process of client's change across sessions. In doing so, it represents the first attempt to (1) describe the dynamic congruence pattern within coach-client dyads across sessions, and (2) link that pattern to several demographic predictors. As such, it represents a complementary investigation to the study reported in Chapter 4, which looked into relationships between movement synchrony and outcomes in association with mediator and moderator variables relevant for coaching. Eventually, the multiple-step exploratory investigations in Chapter 5 resulted in two key findings, as follows:

First, Figure 5.2 depicts the downward trend in the reduced best fitting curve types (linear, quadratic, and cubic) for mean synchrony in the cluster of dyadic interactions (n = 590) that involved 10 coaching sessions. Similarly, Figure 5.3 depicts the downward trend in the reduced best fitting curve types (linear, quadratic, and cubic) for mean synchrony in the cluster of dyadic interactions (n = 982) that involved N = 173 dyads in varied numbers of coaching sessions (Figure 5.1).

Second, the subsequent standard correlation analysis comprising (N = 173) dyads conducted to explore the strength of relationships between the individual variables (i.e., curve type, demographics such as client age, coach gender, client gender, coach's years of experience, and number of coaching sessions) revealed that client age and coach's years of experience show a small but significant correlation. No significant correlations or covariances between and among the groups of curve types and the same demographic variables could be found in the final discriminant analysis (N = 173) in relation to movement synchrony.

The sections below discuss these two key findings in detail, propose some conceptual considerations for movement synchrony, and the sub-chapter closes with making recommendation for future coaching research and practice.

5.6.1 Differential downward trend of movement synchrony

While the downward trend for movement synchrony is clearly indicated for both clusters (i.e., cluster of N = 59 dyads that completed 10 sessions, and cluster of N = 173 dyads that completed various numbers of sessions), the downward trends also indicate a differential change in movement synchrony over time. The difference is indicated in that in both clusters the cubic curve type suggests a slight increase in movement synchrony both at the outset of the coaching engagement and at the end of the coaching trajectory. This difference is more clearly indicated in the cluster that involved N = 173 dyads. While the higher level of movement synchrony at the outset of coaching engagements in association with working alliance has been discussed in Chapter 4, the slight increase in movement synchrony indicated at the end of the coaching trajectory is a nuanced pattern that the present exploratory approach is the first to suggest in association with the length of the coaching trajectory. Earlier coaching literature (e.g., Baron & Morin, 2009, 2010) purports that the number of coaching sessions predicts higher client self-efficacy and that this association is explained by the quality of the coach-client relationship. Other studies (e.g., Sonesh et al., 2015a) report that the number of coaching sessions held is

associated with client's goal attainment indicating that having 1 – 3 sessions is better than having 4 – 6 sessions but not as effective as having 7 – 9 sessions. Although the latter indication may appear counter-intuitive, it supports the nuanced time-series changes in movement synchrony that the cubic curve type suggests at the end of the coaching trajectory. It is possible that movement synchrony increases after 10 sessions again, but we need future research to further investigate the role of the number of coaching sessions in association with movement synchrony. All the more, as Sonesh et al's (2015a) study looked into the association between number of sessions in relationship with goal attainment while the present exploratory approach sought to associate change in movement synchrony as a function of dyadic interactions over time.

Generally, future research needs to investigate the importance of movement synchrony in the coaching process over time as an inherent relationship factor because the discriminant analysis found that the demographic variables did not discriminate among the groups of curve types. Additionally, given that the cluster involving the $N = 173$ dyads showed a clearer trend in changes in movement synchrony as indicated by the curve types (i.e. downward trend is smaller with cubic curve showing clearer trends at the outset and at the end of the coaching trajectory), we argue that process research needs to investigate movement synchrony a) as an inherent relationship factor in association with other contextual factors such as the coaching theme or the gravity of the content dealt with in sessions, and b) involve large samples of coach-client pairs with a minimum population size of $N = 150$ dyads and a coaching engagement of up to $n = 10$ session to arrive at clear deductions and a deeper understanding of the role of movement synchrony in the coach-client relationship.

Our exploratory approach is the first to answer some scholars' call (e.g., Jackson, 2017) that we need exploratory studies to establish useful hypotheses of nonverbal dynamics in coaching for qualitative and quantitative research and that coaching research needs new methodological solutions beyond coach and client self-reports (i.e., automated measurement

tools such as MEA) to tap into nonverbal responsiveness (i.e., physicality) to contribute the development of coaching evidence base. Therefore, it may likewise be of value to explore movement synchrony in coaching as a change process within randomized controlled trials to include control variables.

The call for investigating movement synchrony in association with the coaching theme or the gravity of content dealt with in sessions is grounded in our exploratory analysis showing certain curve type variations in the development of movements synchrony in relation to the number of sessions completed in this study. This variation implies that there may be other factors at play that predict movement synchrony, as was already suggested in Chapter 4. Indeed, it may be that a decrease in movement synchrony as demonstrated in this study implies less coaching success possibly due to 'getting stuck' in the goal attainment process. Getting stuck may be reflected in how coach and client sync in with each other over the course of the coaching engagement. In Chapter 4, we discuss that movement synchrony can be interpreted as a correctional mechanism where coach and client perceive the coach-client relationship to deteriorate or the coaching process to get off track in terms of goal attainment. Therefore, we recommend future research to look into movement synchrony as a way of 'getting unstuck' with goals over time to predict coaching success as it is likely that the gravity of a certain coaching issue has an impact on how movement synchrony is affected in the goal attainment process.

Alternatively, it may be that, as goes for both clusters of coach-client dyads in this exploratory approach, higher initial movement synchrony and the subsequent decrease of movement synchrony (i.e., $n = 982$ dyadic interactions showing a lower decrease than $n = 590$ dyadic interactions) indicate that synchrony becomes less relevant over time and that other factors such as client's autonomy or client's maturity may determine the effectiveness of the change process in coaching, and ultimately coaching success. Potentially, clients gradually grow some capacity to be autonomous in resolving presenting issues through higher levels of

movement synchrony (i.e., as they grow their self-regulatory capacities as discussed in Chapter 4), which may lead to clients feeling less impacted by coach's decreased level of spontaneous responsiveness to their needs. In turn, coaches may grow more daring and risk taking in coaching as clients grow more autonomous in how they address own challenging issues. This dynamic interactional pattern possibly implies that spontaneous responsiveness between coach and client through movement at the outset of coaching becomes less relevant as both coach and client grow autonomous. In other words, movement synchrony as a sign of congruence in meeting needs reciprocally may become unnecessary for feeling safe and coach and client can allow themselves to 'make mistakes' without client or coach feeling impacted by any 'ugly' situation engendered by lack of spontaneous responsiveness to either coach's or client's needs. This interpretation finds support in some studies in development sciences (e.g., Tronick & Beeghly, 2011), which report that synchrony implies mutual regulation of dyadic meaning-making and that interactional exchanges represent alternating periods of dynamic patterns of matching, mismatching, or reparation, potentially as a purposeful interaction by the coach. This dynamic patterning has implications for how relationships can develop over time. Specifically, Tronick and Beeghly (2011) argue that mutual regulation through higher initial synchronous interactional exchanges between infant and caregiver are likely to repair the infant-caregiver relationship in the face of the caregiver's failure to spontaneously respond to the infant's needs at a later point in time. Moreover, client's capacity to attain a sufficient level of autonomy to reach goals on their own has been found to be a key element of goal attainment in coaching (Schiemann, Mühlberger, & Jonas, 2018b).Therefore, we recommend coaching research to further investigate the predictive value of client's autonomy for goal attainment through movement synchrony across varied number of sessions as it may be an additional gateway to how we can conceptualize the importance of physicality in presence-based coaching in the future (Jackson, 2017).

5.6.2 Correlations between change in movement synchrony and demographic variables

As regards the change in movement synchrony across sessions, our exploratory investigations showed no positive correlations between the number of sessions and movement synchrony either in the correlation analysis or in the discriminant analysis. On the one hand, some coaching literature reports similar results in relationship with other factors such as coaching outcomes in association with the number of sessions, while other studies report differential results, as discussed below. One meta-analysis (Theeboom, Beersma, & Van Vianen, 2014) following calls by Smither (2011) to examine the effects of the number of coaching sessions on the overall longevity of coaching interventions investigated the effects of coaching on several outcome criteria. That particular study found that a greater number of coaching sessions did not relate to higher effectiveness of coaching. However, above studies tested only for linear effects of number of sessions and longevity of the intervention and outcomes. Another meta-analysis on the effectiveness of workplace coaching (Jones et al., 2014) tested the number of sessions (coaching schedule) for moderation including linear and curvilinear effects in their analysis. That meta-analysis concluded that none of the effects were significant and that neither longevity of the coaching intervention (in weeks) or number of coaching sessions moderated coaching outcomes. In particular, curvilinear effects indicated that there was a plateauing of the impact of coaching. That indication may mean that additional sessions or weeks of coaching do not impact up and that even short-term coaching may have a beneficial impact on client's goal attainment. Most recently, some coaching effectiveness outcome studies (de Haan et al., 2019; Molyn et al., 2019; Zimmermann & Antoni 2020) found that while the effectiveness of coaching grows over the course of the coaching engagement as an overall measure, the level of effectiveness in terms of outcomes changes from session to session. This may be the result of each consecutive session in the coaching engagement having its own specific challenges (and therefore levels of effectiveness in terms of outcomes). This indication is corroborated in

studies investigating dynamic change processes (i.e., forming, norming, storming, performing phases) in team development (Kozlowski & Chao, 2018) reporting that team-level processes and outcomes are multilevel phenomena that emerge and bottom up from the interactions among team members over time, under the shifting requirements of each work context. In one particular coaching study (Molyn et al., 2019), only some process variables such as the task-focus component of working alliance predicts outcomes when measured at the outset and if regressed against the last session outcome. In-between sessions, only task-focus predicted coaching outcome, and this task-outcome effect was not found to be produced for each data point. On the other hand, apart from a few studies conducted on interactional processes in coaching (Ianiro, Lehmann-Willenbrock, & Kauffeld, 2015; Ianiro, Schermuly, & Kauffeld, 2013; Ianiro & Kauffeld, 2014; Schermuly & Scholl, 2012) which report that dominant-friendly interactional behaviors between coach and client in the first session lead to clients' feeling safe in the relationship after the third session, the association between movement synchrony and the number of coaching sessions in the change process has remained unaddressed.

5.6.3 Conceptual considerations

As outlined in the introduction in Chapter 5, movement synchrony is conceptualized as an embodied phenomenon. Nonverbal responses through the body as they occur spontaneously in interaction with our interlocutor beyond our conscious awareness are argued to play the central role. The body is viewed as the instrument that will indicate the extent to which we are congruent with each other any given moment. This conceptualization implies that the coach's 'way of being present with clients authentically' has the potential to shape client's 'way of being present with the coach authentically'. In other words, in our study, Silsbee's (2008) suggestion that the body is able to work in partnership is consistent with how congruence is theorized as a reciprocal authentic interactional exchange expressed through the coach's and client's nonverbal responses in the coaching process. Silsbee (2008) purports that this

partnership ultimately means that presence evokes change in both the coach and the client rather than the client alone. Hence, we suggest that presence works both ways: client's way of being present through spontaneous nonverbal responses with coach authentically will equally evoke change in the coach. Therefore, in Chapter 4, we applied the theory of interpersonal movement coordination (IMC, Bernieri & Rosenthal, 1991), which claims that the quality of the interaction between two individuals is influenced by how these individuals manage to spontaneously respond to each other in the moment. IMC recognizes that movement synchrony will influence the affective and mental sates of both interactants in the relationship. We argue that unless clients perceive the coach as congruent in how they respond to client's needs beyond the use of verbal language, they will not experience rapport, trust or empathy (Kolden, Klein, Wang, & Austin, 2011) as crucial components of working alliance (Bordin, 1979). Congruence as expressed physically through spontaneous responsiveness between coach and client possibly plays an important role in how presence as a key element of coaching effectiveness (e.g., Jackson, 2017) can emerge in the coach-client relationship. Jackson (2017) argues that by developing a greater understanding of physicality as an embodied perspective in coaching we can gain an understanding of felt experiences as subtle practices in coaching (Gendlin, 1969, 2003).

5.6.4 Questions for future coaching research

In Chapter 5, we computed average movement synchrony per session (see Chapter 4 for measurement details) to explore the dynamic pattern of movement synchrony across sessions. In doing so, we studied the change in movement synchrony of entire dyadic trajectories. However, the dynamic pattern of movement synchrony within one and the same coaching session for dyads across time segments has remained unexplored. This exploratory approach involving the computation of mean movement synchrony levels across dyads is likely to have the capacity to shed light on the dynamic patterns of movement synchrony as they manifest in

the first session compared to the final session in dyads. Such an exploratory approach aims to produce movement synchrony time curves for sessions rather than time curves for entire dyadic trajectories. We find support for our exploratory approach in therapeutic literature (Altmann et al., 2020; Ramseyer, 2020; Ramseyer & Tschacher, 2008). Given the unexplored within-dyadic change of movement synchrony across time segments in our research project and based on the conceptual considerations in 5.6.1 above, we call for coaching research to further investigate the following themes:

(i) studying the development of movement synchrony dynamics of a total coach-client trajectory within a session to explore synchrony dynamics in the first session as compared to synchrony dynamics in the final session for that dyadic trajectory;

(ii) studying the development of movement synchrony dynamics of all coach-client trajectories within a session to study synchrony dynamics in all first sessions as compared to synchrony dynamics in all final sessions for the entire set of dyadic trajectories.

Additionally, as (a) our investigations indicate that movement synchrony generally shows a downward trend in the coaching process; and (b) there appears to be no association between the change in movement synchrony and coach / client specific characteristics such as client age, coach gender, client gender, or coach's years of experience, we advocate further research into movement synchrony in coaching as a change process on the basis of the following research questions:

(1) How can we interpret the clear yet differentiated downward trend of movement synchrony for coaching success across sessions and over time?

(2) How is the trend in movement synchrony related to coach's years of experience and client's age, coaching content, and the gravity of a coaching issue? How to work with movement synchrony to facilitate client's growth and autonomy over time?

(3) How is the decrease of movement synchrony related to working alliance in coaching?

While some studies show that gender similarity (e.g., Bozer et al., 2015) has (a small) significant effect on coaching outcome, there is less convergence in findings when it comes to coach's attributes such as coaching experience. For instance, Lai & McDowall (2014) report that coach's training/background has a significant influence on the coaching process and results, while Sonesh et al (2015a) showed that coach's experience was unrelated to client's goal attainment. We argue that this emerging lack of convergence in coaching literature implies that we may only interpret findings appropriately if and where we sufficiently account for the context in which coaching has taken place and that it may therefore be inappropriate to draw simple generalized conclusions. Therefore, the following question may be worthwhile exploring in future research:

(4) How can we instrumentalize congruence between coach and client as an expression of some authentic interpersonal exchange to indicate coaching success?

This fourth question warrants investigation in coaching as social cognitive and developmental psychology as well as psychotherapy research have accumulated considerable evidence that nonverbal synchrony has beneficial effects on emotional and cognitive self-regulation. All the more as the perspective of embodied congruence is well established in presence-based coaching (Silsbee, 2008). It follows Bluckert's (2006) idea of the 'use of self' (i.e., the awareness of cognitive and emotional responses in the body) in coaching as a tool to explore dynamics in the coach-client relationship. However, embodied congruence has

remained a coach-specific concept of presence although our coaching research investigating movement synchrony theorized that synchrony is a reciprocal dynamic development between coach and client in the here and now of interactional exchanges and therefore important for the specific skill of coaching presence (see discussion in Chapter 4).

5.6.5 Recommendations for coaching science and practice

Theoretically, as there is no additional coaching research that has looked into the association between movement synchrony and the number of coaching sessions in the change process, based on the discussion above, we recommend future research to look into the predictive value of movement synchrony in client's goal striving and goal attainment as a change process, that is by observing time series of interactional processes in association with goal attainment as client's goal directed behavior beyond coaching. As goes for the small but significant correlation between client age and coach's years of experience, we additionally recommend coaching research to specifically investigate these parameters in association with movement synchrony in randomized controlled trials where there is possibility to control for these variables.

Practically, we recommend coaches to be trained in working with movement synchrony as an interactional and interpersonal phenomenon as it is shown to have a dynamic impact on client's change process. As coaches get trained in observing the impact of movement synchrony on interactional processes with clients, they may form a capacity to differentiate which number of sessions is most likely to impact client's growth in the coaching engagement over time. This is particularly relevant as movement synchrony can be consciously applied to work with clients through the concept of 'the self as tool' (Bluckert, 2006) well-established Gestalt-oriented coaching (Bluckert, 2006, Leary-Joyce, 2014), where the present awareness of nonverbal aspects of the coach-client encounter is instrumentalized to explore dynamics in the coach-client relationship away from goal attainment and performance-driven outcomes.

5.7 Limitations

The most important limitation of the present exploratory approach is that it is not a randomized control trial as the most optimal design (Robertson, et al., 2017). It is an ex-post exploration without accounting for a waitlist control group.

5.8 Conclusion

The exploratory approach investigating the question "What's in the trajectory of dyadic interactions?" in association with movement synchrony in coaching as a change process indicates that there is a trend of downward movement synchrony across sessions over time in the coaching process. This indication implies that we need further studies in coaching process research to gain a deeper understanding of the predictive impact of movement synchrony on client's change process and goal attainment.

Chapter 6. General discussion

The main focus of this PhD dissertation was to investigate client's change process in coaching. Specifically, the purpose was to contribute to coaching knowledge on how clients change over the course of the coaching engagement beyond attaining a specific goal. To meet that purpose, the aim was to investigate what clients contribute to their change process and how working alliance (Bordin, 1979) as expressive of the quality of the coach-client relationship influences client's change process over time.

Thus, Chapter 2 presents a comprehensive picture of how client characteristics contribute to how clients learn and grow in coaching as a change process. In applying the process-oriented lens of a qualitative meta-synthesis we identified which client factors may affect the change process and how these client factors may play out in the coach-client relationship as client's most immediate context. We conceptualized the client factors in their dynamic interconnectivity as they were revealed in the coaching process to contribute to building the knowledge base about these factors in future hypothesis-testing studies about coaching as a change process.

On the basis of the findings of the qualitative meta-synthesis, I identified three core themes which have the capacity to influence client's dynamic change process beyond goals, as follows:

(a) the role of client's self-regulation;

(b) the dynamics of movement synchrony; and

(c) the role of working alliance in client's change process.

A large-scale quantitative study adopting two different conceptual approaches investigated the change process in coaching covering the three core themes outlined above. The two

investigative approaches are reported in Chapter 3 and Chapter 4, respectively. Chapter 3 outlines the change process by looking into the affective, cognitive and behavioral aspects of client's personality as they influence the process of client's emotional self-regulation in client's authentic self-development as the ultimate goal of coaching. Chapter 4 outlines the change process by looking into coach / client interactional processes through movement synchrony. This chapter reports the impact of movement synchrony on client's self-regulatory capacities in the process of client's goal-directed behavior and theorizes that working alliance is likely to strengthen or weaken the association between movement synchrony and client's self-regulation over time. Chapter 5 reports a third and final exploratory study which further looked into the importance of movement synchrony as a process across individual sessions per coach-client dyad to complement our picture of the average effects of movement synchrony on client's change process over time. Chapter 6 discusses the key findings reported in each study (Chapters 2-5) for each of the three core themes. Finally, Chapter 6 concludes by outlining some strengths and limitations of our research and provides recommendations for future research and practice based on the implications identified in this PhD dissertation.

6.1 Key findings per core theme

Table 6.1 summarizes the research questions and key findings per empirical chapter and in that way provides an overview for discussing how these key findings relate to the three core themes.

Table 6.1. Summary of research questions and findings

Chapter	Research question	Key findings
Chapter 2 - Qualitative Meta-Synethsis	Q1: Which client factors and contextual factors reported in primary qualitative studies are relevant for coaching effectiveness?	- Data analysis produced three client-related aggregate dimensions: emotion, attitude, and behavior, as well as context as the fourth dimension; the meta-synethsis indicates that we have insufficient focus on the client with a specific emotionality as the majority of studies investigat behavior as a goal-attainment measure.
	Q2: How do primary qualitative studies suggest that these factors interrelate in clients' learning as a context-sensitive and dynamic change process?	- The Integrative Relationship Model (IRM) indicates that client's experiences can be conceptualized from (a) a lens of dynamic interrelatedness as clients undergo their change process, and (b) a nuanced perspective of dynamic interrelatedness as they emerge in client's social contexts. - IRM maps that dimensions interrelate dynamically in that either one dimension directly relates to another dimension, or in that one dimension relates to another dimension via a third dimension.
Chapter 3 - Study on ABCDs of the Big Five in Authentic Self-Development	RQ3: How do the ABCDs of clients' Big Five personality traits impact client's authentic self-development as explained by affect balance?	- Both the Big Five trait levels of Agreeableness, Conscientiousness, Emotional Stability, Extraversion, and Openness as well as the psychological components of these traits (i.e., ABCDs: Affect, Behavior, Cognition, Desire) predicted three out of four aspects of authentic self-development (i.e., higher levels of perceived competence, goal commitment, goal self-concordance but not goal stability); - The 2-1-2 multilevel path models showed that the overall affect balance over sessions rather than the change in affect balance explained the direct relationship between personality and two aspects of authentic self-development: perceived competence and goal commitment, but not self-concordance and goal stability.
Chapter 4 - Study on Movement Synchrony and Working Allliance as a Moderator	Q4: What is the impact of nonverbal synchrony (spontaneous movement coordination) on client's self-regulation capacities as operationalized through self-reported affect balance?	- In the high-outcome group (top 33% of goal attainment), synchrony had no significant association with any other variable in both temporal as well as contemporaneous networks. - In the mid-level outcome group (mid 33% of goal-attainment), there were positive associations between synchrony and bonding in working alliance in the contamporaneous network and positive assocations between synchrony and task-focus in working alliance and goal-orientation the between-network analyses. - In the low-outcome group (low 33% of goal-attainment), there were negative associations between synchrony and task-focus in working alliance in the temporal network analyses as well as negative associations between synchrony and cognitive self-regulation in the between-network analyses. - The mid-outcome subsample provided the highest number of associations in the temporal network: Synchrony negatively predicted positive affect, goal-reflection, all aspects of working alliance, and it was negatively predicted by concreted changes in cognitive self-regulation. For the contemporaneous network, there was a negative association with bonding in working alliance and a positive association with self-organisation in cognitive self-regualation. The between-network analysis indicated that synchrony and negative affect were negatively associated across dyads.
	Q5: What is the impact of nonverbal synchrony (spontaneous movement coordination) on client's self-regulation capacities as operationalized through result-oriented problem and self-reflection?	- A lower level of synchrony in a previous session predicted higher task-orientation, higher goal-setting, and higher goal-reflection in the next session.
	Q6: What is the impact of self-regulation on client's goal-directed behavior in coaching as operationalized through affect balance?	- Higher positive affect predicts higher goal attainment
	Q7: What is the impact of self-regulation on client's goal-directed behavior in coaching as operationalized through result-oriented problem and self-reflection?	- Higher goal-reflection predicts higher goal attainment
	Q8: How does working alliance moderate the direct effects of nonverbal synchrony on client's self-regulation (operationalized through result-oriented problem and self-reflection as well as positive and negative affect) in coaching?	- Clients reported low levels of bonding in working alliance in sessions with high levels of nonverbal synchrony - Interaction effects in mixed model analyses showed that the effect of nonverbal synchrony on cognitive self-regulation (RoPS) largely depended on the expression of working alliance as well as mood as moderators; In dyads with high working alliance, nonverbal synchrony appears not to act as a beneficial factor for other process variables, while dyads with low working alliance showed a positive connection between synchrony and cognitive self-regulation.
Chapter 5 - Movement synchrony over time	Q9: How does nonverbal synchrony (spontaneous movement coordination) develop over time per session and dyadic interaction?	- There is a clear downward trend in movement synchrony over time in the cluster that completed 10 sessions and the cluster with 173 dyads completing varying number of sessions. The downward trends are indicative of differential change in movement synchrony over time. The difference lies in that the cubic curve type suggests a slight increase in movement synchrony both at the outset of the coaching engagement and at the end of the coaching trajectory. This difference is more evident in the cluster that involved N = 173 dyads. - No significant correlations or covariances between and among the groups of best fitting curve types and the demographic variables of coach / client gender, client age, number of sessions, or coach's years of experience could be found in the final discriminant analysis (N = 173) in relation to movement synchrony.

6.1.1 The role of client's self-regulation

The first core theme investigated in this PhD dissertation involves the role of client's self-regulation in how clients change process plays out across sessions and over time. To date, the coaching literature has not explored self-regulation as a process of psychological functioning although coaching effectiveness research has looked into specific client attributes such as resilience as a specific outcome of coaching (e.g., de Haan et al., 2016; de Haan et al., 2020; Grant et al., 2009; MacKie, 2015; Molyn et al., 2019). Recently, a study (de Haan et al., 2019) measured resilience at multiple data points and found that resilience contributes to coaching effectiveness. To address self-regulation as a process of psychological functioning, this thesis responds to claims that coaching is ruled by the principles of self-regulation in that coaching is "essentially about helping individuals regulate and direct their interpersonal and intrapersonal resources in order to create purposeful and positive change in their personal or business lives." (Grant, 2012, p. 149). This core theme is reflected in different facets in three empirical investigations (Chapter 2, 3, and 4).

Chapter 2 provides a qualitative meta-synthesis focusing on identifying the dynamic patterns of client's intrapersonal and interpersonal change process. This meta-synthesis points to a tendency in coaching research to measure what is most obviously measurable (i.e., behavior and attitude) in goal attainment with client's emotionality being in the background of investigative efforts. Therefore, Chapter 2 first explores ways in which to arrive at an integrative theory of client's intrapersonal dynamics through the process-oriented lens of a qualitative meta-synthesis. We propose that this approach potentially progresses knowledge building about how coaching works for clients as a change process rather than as an input-output agenda. Therefore, Chapter 2 consolidates the dispersed body of primary qualitative text data in coaching literature and reports relatively consistent dynamic patterns of client-specific

factors in the coaching process as trustworthy and dependable insights into how to investigate client characteristics in future quantitative and qualitative research.

First, the qualitative meta-synthesis produces the Integrative Relationship Model (IRM) as a conceptual framework that maps the interrelatedness of client's emotion, attitude, and behavior as an intrapersonal process as framed by contextual factors such as the coach-client relationship as an interpersonal process. Second, it maps client's emotion, attitude and contextual factors as they are suggested by primary qualitative studies to influence client's propensity for certain behaviors in specific situations (e.g., fear of uncertainty leading to doubt and eventually to lack of engagement) in the change process. While we can find some support for this intrapersonal process in quantitative research (e.g., MacKie, 2015), IRM indicates that emotion (e.g., fear, anger, uncertainty, excessive affect) is a client characteristic that is heavily under-researched and under-theorized in coaching. It is a development which latest neuroscience research into emotion corroborates (Barrett, 2017) too. The current state of play in coaching research appears to be due to how coaching research has placed the focus on more easily measurable factors such as client's behavior and cognitive processes to understand shifts in behavior for goal-attainment in coaching.

In contrast, we claim that IRM with its focus on the dynamic intrapersonal patterns of emotion, attitude and behavior as a regulatory framework provides possible answers to the issue of inconsistent effectiveness that coaches encounter when applying certain techniques (e.g., GROW model) that prove to be effective with some clients while they remain ineffective with some others.

In sum, the qualitative meta-synthesis in Chapter 2 inspired us to investigate client's emotion and attitude as a process (i.e., affective and cognitive self-regulatory capacity) both in a quantitative (Chapters 3 and 4) and qualitative effort (Chapter 5). We recognized that looking into client's affective and cognitive self-regulatory capacities using a quantitative approach implies methodological challenges in how we need to balance our efforts in making meaning

of the client both as the 'whole person' (Taylor, 1998) and some individual facets of that client (e.g., mood, attitude). To counter these methodological challenges, we decided to investigate client's emotional and cognitive self-regulatory capacities applying an input-process-output approach (e.g., Ianiro & Kauffeld, 2014; Molyn et al., 2019). Additionally, we conceptualized coaching as a process-oriented activity (Greif, 2017) and introduced two investigative approaches to explore client's self-regulation as a process variable in coaching. In the first investigative approach, IRM served as a conceptual resource to measure client's self-regulatory capacity reflecting the emotional perspective of self-regulation in the coaching process. In the second investigative approach, IRM served as a conceptual resource to measure client's self-regulation reflecting both the emotional and cognitive perspectives of self-regulation in the coach-client relationship as client's most immediate context in an integrative manner.

Chapter 3 builds on the insights into how to investigate the nuanced dynamics of client's intrapersonal processes of emotion, attitude and behavior on the basis of IRM as our change process model. It reports the first quantitative investigative approach which looks into client's self-regulatory capacity reflecting the emotional perspective of self-regulation through affect balance. We first investigate the affective perspective of self-regulation to address the issue of client's emotionality as an under-researched phenomenon in coaching as a change process. In doing so, affect balance is measured in association with client's personality across sessions and over time. We adopt a specific lens on personality which directs our investigative focus on the specific affective, cognitive and behavioral and motivational dimensions (ABCDs, Revelle, 2007; Wilt & Revelle, 2009, 2015) of the Big Five personality traits (John & Srivastava, 1999) as they influence how clients can engage in authentic self-development as the ultimate expression of goal attainment over time (see Chapter 3 for a detailed definition).

We selected this investigative lens as IRM reflected that client's intrapersonal change process comprises complex patterns of affective, cognitive and motivational dynamics. We were interested in associating these dynamic client-related patterns with client's capacity to

regulate emotion towards goal attainment across sessions. The aim was to explore the role of affective self-regulation in client's authentic self-development beyond goals.

Despite attempts in coaching research to capture the predictive value of client's personality traits on coaching outcomes (e.g., de Haan et al., 2016; de Haan et al., 2019; Jones et al., 2014; Stewart et al, 2008) studies mostly operationalized mean levels of the Big Five constructs producing sparse findings. As these findings are descriptive in nature they do not explain how and why certain traits are likely to lead to client's successful goal attainment. Specifically, these studies do not explore goal attainment as client's striving for authentic self-development. Therefore, the theoretical approach in Chapter 3 focuses on the coherence of patterned dynamics of the four personality dimensions as they represent a balanced way for studying the temporal and spatial dynamics of personality (e.g., Read et al., 2010). We argued that it is the ABCD-level qualities of personality traits that will explain their effect (e.g., O'Neill & Steel, 2017). In particular, we suggest that studying personality traits by covering the conceptual content of traits more completely (e.g., Pytlik Zillig et al., 2002) is a meaningful way forward to shed light on how clients self-regulate in their striving for authentic self-development. Specifically, we suggest that the Self-Regulation-Model (SRRM) by Sirois (2015a, b) is likely to most appropriately answer this call as it has been tested to explain the links between personality and health behaviors (Sirois, 2015a, 2015b).

In conceptualizing affective self-regulation as meditating the association between client's personality as patterned dynamics of affect (A), behavior (B), cognition (C), and desire (D) and client's striving for authentic self-development, this study investigates the role of client's self-regulation in 176 coach-client dyads. These dyads comprise an international sample of real clients engaging in coaching with professional coaches in the field of business, career and management development. It produces the following key finding on the role of client's emotional self-regulation:

(a) The overall affect balance over sessions rather than the change in affect balance explained the direct relationship between personality and two aspects of authentic self-development: perceived competence and goal commitment, but not self-concordance and goal stability. This may be explained by affect balance representing a quality that is not quantifiable to explain client's self-regulation. In other words, More affect balance does not lead to higher self-regulation but constant affect balance will.

Additionally, it reveals that:

(b) Both the Big Five trait levels of Agreeableness, Conscientiousness, Emotional Stability, Extraversion, and Openness as well as the psychological components of these traits (ABCDs) predicted three out of four aspects of authentic self-development (i.e., higher levels of perceived competence, goal commitment, goal self-concordance but not goal stability). This result may be explained by the balanced representation of the psychological components in the personality questionnaire used for this study. The fact that personality did not predict goal stability confirms that in this study the aim was to study client's capacity to pursue goal-directed behavior rather than the capacity to rigidly adhere to goals that may prove to be irrelevant in the course of the change process in coaching.

Chapter 4 extends these findings by examining how client's self-regulatory capacity influences client's more general goal striving in coaching. In doing so, we investigate goal attainment as client's engagement in sustained goal-directed behavior beyond specific goals to be attained in coaching (Bachkirova & Smith, 2015). This goal striving perspective finds support in coaching literature (e.g., Schiemann, Mühlberger, & Jonas, 2018b) suggesting that coaching effectiveness is ultimately about client's attaining autonomy in the coaching process. Additionally, Chapter 4 integrates working alliance as IRM in Chapter 2 served as a conceptual

resource to further measure client's intrapersonal processes in the coach-client relationship as client's most immediate context in coaching in an integrative manner.

For the purposes of this integrative investigative approach of our large-scale empirical study, we extend the conceptual framework of the self-regulation model we used for exploring Q3 in Chapter 3 (see Table 1, Chapter 6) to include the cognitive aspects of self-regulation (Greif, 2017). This integrative investigative approach was expected to complement our understanding of the role of client's self-regulation in coaching as a context-sensitive and dynamic change process.

Specifically, in Chapter 4 self-regulation indicates a meta-cognitive monitoring ability (Greif & Berg, 2011) that focuses on result-oriented problem- and self-reflection (RoPS) and also affects emotion regulation (Feldman, 2015; Hayes & Feldman, 2004). Self-regulation integrates self-regulatory processes 'as the set of psychological processes through which people bring their thoughts, feelings, and behaviors in line with abstract standards, goals, or values' (Koole, Kuhl, Jostmann, & Finkenauer, 2006, p. 206).

Finally, in Chapter 4 we explore the coach-client relationship as a factor that has the capacity to strengthen or weaken the association between interpersonal interactions between coach and client and client's affective and cognitive self-regulation in their goal-directed behavior. The conceptual approach of working alliance as a moderator finds support in social exchange theory (Blau, 1964) for explaining that in high-quality coaching relationships clients are potentially more open and trust coaches. More openness and trust in coaches are likely to enhance coaching success (Graßmann et al., 2020). Therefore, we were interested in including working alliance as a factor that can either strengthen or weaken the way in which interpersonal interactions between coach and client predict client's self-regulation in an integrative manner in coaching.

The investigative approach in Chapter 4 investigates the role of client's emotional and cognitive self-regulation in 184 coach-client dyads. Similar to the first investigative approach

in Chapter 3, these dyads comprise an international sample of real clients engaging in coaching with professional coaches in the field of business, career and management development.

The complex temporal and network models used to measure self-regulation in this investigative approach produces the following five key finding on the role of client's emotional and cognitive self-regulation as a mediator of interpersonal processes between coach and client and client's goal-directed behavior in coaching over time.

(a) Interaction effects showed that the effect of coach / client interpersonal interactions (i.e., movement synchrony, see section 6.1.2 below) on client's cognitive self-regulation largely depended on the expression of working alliance as well as affect as moderators (the latter finding came unexpected; effects were revealed only on refining data analysis steps). In dyads with low working alliance showed a positive association between movement synchrony and cognitive self-regulation. This dynamic pattern explains the relevance that client's context plays in coaching as a change process, which is congruent with findings in Chapter 2.

(b) In the low-outcome group (low 33% of goal-attainment), there were negative associations between movement synchrony and cognitive self-regulation in the between-network analyses. This mediation relationship indicates that client's cognitive self-regulatory capacity is influenced by coach / client interactional processes, which will impact client's capacity to pursue their goal-directed behavior beyond goals.

(c) A lower level of synchrony in a previous session predicted higher cognitive self-regulation in the next session. This temporal effect can be explained by the role that coaching plays as a self-regulatory mechanism, which confirms findings on self-regulation in Chapter 3.

(d) Higher positive affect and (e) higher cognitive self-regulation predicted higher capacity in clients to pursue their goal-directed behavior beyond goals three months after

completion of the coaching engagement, which confirms the importance of emotion in client's change process (Chapter 2). These findings extend our understanding of the role of self-regulation as client's capacity to reflects goals in a result-oriented manner appears to explain their capacity to pursue a goal-directed behavior beyond goals in coaching.

Given the dynamic patterns of emotional and cognitive self-regulation in client's change process as explored in this investigative approach, the role of self-regulation appears to be complex, which confirms indications in IRM that client's change process is not an input-output mechanism. Ultimately, working alliance positively or negatively influences how interactions between coach and client can support client's capacity to self-regulate in their goal-directed behavior beyond goals.

The findings throughout this PhD dissertation (except for Chapter 5, which explored the development of movement synchrony as dyadic trajectories) show that client's self-regulation plays a dynamically patterned role in the change process beyond goals in coaching.

6.1.2 The dynamics of movement synchrony

The second core theme investigated in this PhD dissertation involves the dynamics of movement synchrony in client's change process across sessions and over time. We conceptualize movement synchrony in the theoretical framework of the well-established field of interpersonal movement coordination (IMC, Bernieri & Rosenthal, 1991), and we draw on the extant psychotherapy literature (Ramseyer & Tschacher, 2011, 2020) to explore this concept in coaching.

To date, the coaching literature has not explored movement synchrony as a concept of spontaneously responding to each other in coaching through movement as way to predict client's self-regulation. However, coaching research has made first attempts to look into coach

/ client interactional processes (e.g., (Ianiro & Kauffeld, 2014; Ianiro, Lehmann-Willenbrock, & Kauffeld, 2015; Ianiro, Schermuly, & Kauffeld, 2013; Schermuly, Schroeder, Nachtwei, & Scholl, 2010) analyzing both verbal and nonverbal behavioral exchanges act by act in coach-client dyads. While these initial studies demonstrated that working alliance depends on the degree of dominance and affiliation of coach / client interactions, they did not explore the interaction effects of spontaneous body movement on both client's emotional and cognitive capacity to regulate the self in goal attainment. Nor did they explore working alliance as a factor that is likely to strengthen or weaken the association between movement synchrony and client's self-regulation. To address this issue, in this thesis we propose that nonverbal synchrony – measured as the coordination of body-movement between coach and client across sessions – may be viewed as a dyadic dynamic phenomenon through which client's capacities for emotional and cognitive self-regulation predict client's goal-directed behavior in coaching. We also propose working alliance shapes the relationship between movement synchrony and client's self-regulation in the change process. This second core theme is reflected in different facets in three empirical investigations (Chapter 2, 4, and 5).

Chapter 2 introduces the Integrative Relationship Model (IRM) based on the qualitative meta-synthesis advocating an understanding of coaching as client's dynamic change process in interrelatedness with contextual factors (Sheldon et al., 2015). Specifically, we propose that in order to discover, examine and understand client's nuanced behaviors, we ought to focus on both client's self and coach's self as they interrelate in the coaching process. We call for this awareness of interrelatedness to fully understand the patterned dynamics that represent the integrative nature of coaching as a joint meaning-making process (Drake, 2015). As such, IRM forms the linchpin of the quantitative approach to the coaching process research reported in Chapter 4, in which the purpose was to account for how the dynamic interrelatedness of client's self and coach's self may influence client's self-regulation as shaped by working alliance.

Chapter 4 adopts the dynamical systems perspective in social psychology (Kelso, 1995) as reflected in IRM. The aim is to gain a deeper understanding of how to further strengthen client's self-regulatory capacities in client's goal-directed behavior. To that end, Chapter 4 investigates the predictive value of movement synchrony as a specific form of nonverbal interactional process between coach and client for client's goal-directed behavior as shaped by working alliance.

Findings on the dynamics of movement synchrony reported in Chapter 4 are highly differentiated. They reflect the nature of coaching as an interactional change process that is complex and adaptive at the macro-level of coaching. This interactional process is similar to how the coach-client relationship is viewed as a "complex adaptive system" (O'Broin & Palmer, 2010, p. 28) at a more micro-level of coaching as a change intervention in this Chapter. Specifically, the three key findings on the dynamics of movement synchrony can be categorized as follows:

(a) Mean effects of initially high movement synchrony showed a linear trend for a temporal decrease as explained by the moderator effects of working alliance, albeit in a differentiated and complex manner (see Chapter 4 for details). Specifically, interaction effects in mixed model analyses showed that the effect of movement synchrony on client's cognitive self-regulation largely depended on the expression of working alliance. The high level of complexity and dynamicity at the macro-level of the change process may be explained by both working alliance and movement synchrony being interactional process variables each with their specific level of dynamic interrelatedness at the micro-level. As such, coaching is shown to be a dynamic change process.

(b) A lower level of synchrony in a previous session predicted higher task-orientation, higher goal-setting, and higher goal-reflection in the next session. We interpret these two associations as indicative of some "correctional mechanism" that emerges at a point

in coaching where the process is perceived to be deteriorating. Specifically, in dyads where progress is perceived to "get off track" (i.e., clients reporting low cognitive and emotional self-regulation and low working alliance), higher levels of movement synchrony are indicative of emerging efforts to correct the deteriorating quality of the coach-client relationship or the yet unproductive coaching process. We argue that where the coach-client relationship is strong (i.e., shared goal/task focus, bonding) it is not relevant whether or not coach and client sync in with each other, while movement synchrony becomes necessary where working alliance is poor.

(c) Low movement synchrony is associated with high goal attainment; high movement synchrony is associated with low goal attainment and low goal orientation; and a medium level of goal attainment is not associated with overall positive or negative affect over time. These differentiated findings explain findings (a) and (b) above that synchrony can help an harm client's change process, and that placing the focus on creating what we refer to as an authentic environment (as discussed in Chapter 4) may be more beneficial to clients as there are too many factors that interact in the coaching process when it comes to making full sense of client's dynamic change process in coaching.

Chapter 5 extends these findings on the dynamics of movement synchrony in coaching by exploring the potential relevance of temporal aspects of movement synchrony in the coaching process. Specifically, we look into how average movement synchrony evolved from session to session per dyadic interaction. In applying cross-correlation and discriminant analyses, we further complement our understanding of movement synchrony as it changes for dyads across session to highlight the extent to which the number of sessions factors in when it comes to client age, coach / client gender, or coach's years of experience in the change process of movement synchrony. We explore the specific temporal pattern of movement synchrony across a) the

cluster of dyads that completed 10 coaching sessions, and b) 173 dyadic interactions with a varied number of coaching sessions. This purely exploratory approach aims to complement our understanding of the picture we gained of client's change process (i.e., self-regulatory capacities, the influence of working alliance) through averaged cross-correlations of movement synchrony across segments within a dyadic session. Digging deeper into the serial representation of movement synchrony is relevant as latest psychotherapy research has produced heterogeneous associations between nonverbal synchrony and working alliance and rather homogeneous results when it comes to therapeutic success (see Chapter 4 for details).

This exploratory approach produces the following two results:

(a) movement synchrony shows a downward trend in the coaching process, albeit with variations (i.e., linear downward, cubic, and quadratic best curve fits), which indicates a differential change in movement synchrony over time that can be explained by the slight increase in movement synchrony suggested by the cubic curve type both at the outset of the coaching engagement and at the end of the coaching trajectory.

(b) no association can be found between the development of movement synchrony and coach / client characteristics such as client age, coach / client gender, number of sessions, or coach's years of experience. The lack of significant associations can be explained by movement synchrony being an interactional phenomenon rather than a factor that is correlational with demographic variables. Specifically, the lack of correlation and covariance between the development of movement synchrony and the number of coaching sessions may mean that additional sessions or weeks of coaching do not impact up and that even short-term coaching may have a beneficial impact on client's goal attainment. However, there may be other factors (i.e., gravity of coaching issue, coaching content) that need to be accounted for in how we attempt to make

meaning of the differential change in movement synchrony as an interactional phenomenon in coaching.

These findings indicate that there is necessity to further study the coaching process to gain a deeper understanding of the predictive impact of movement synchrony on client's change process towards goal attainment. Section 6.2.2 below recommends specific directions for future research.

6.1.3. The role of working alliance in client's change process

The third core theme investigated in this PhD dissertation involves the role of working alliance in client's change process. We conceptualize working alliance drawing on psychotherapy literature (Bordin, 1979) to explore this well-established concept describing the quality of the coach-client relationship in coaching in association with client's self-regulation. To date, coaching research has not explored working alliance as a factor that is likely to strengthen or weaken the association between movement synchrony and client's self-regulation.

Specifically, for the purposes of this dissertation, and following the most recent theoretical position that working alliance is associated with but does not cause coaching outcomes (Graßmann et al., 2020), working alliance indicates an interpersonal variable with moderator effect. As such, we propose that it strengthens or weakens how movement synchrony relates to client's capacity to self-regulate in coaching over time. Investigating working alliance as a moderator is selected as the novel approach to looking into the role of working alliance in coaching to deepen our understanding about the extent to which working alliance is attributable to how coaching as a process produces change in and for clients. We address the issue of the role of working alliance in the change process in the wake of recent studies (i.e., Molyn et al., 2019) reinforcing the debate around the role of working alliance in sessions over time. This

third core theme is reflected in the empirical investigations in Chapter 2 and 4, while Chapter 5 indicates possible implications for future coaching research

Chapter 2: In the qualitative meta-synthesis, we argue that coaching literature provides insufficient theoretical frameworks to comprehensively explain how client's change process emerges as embedded in contextual factors such as the coach-client relationship (Grant, 2017). This view finds support in some coaching scholars' proposition (e.g., Cavanagh, 2013; Terblanche, 2014) that investigating coaching remains necessarily incomplete unless researchers account for the dynamically patterned context-sensitive nature of coaching when exploring client's change process. The lack of comprehensive conceptualization of client's change process as influenced by the coach-client relationship as client's immediate context is further deepened by coaching literature (Bachkirova et al., 2015) arguing that contextual factors do not significantly influence coaching outcomes. IRM in Chapter 2 forms the basis of the first quantitative investigation (see Chapter 4), which accounts for how working alliance influences the dynamic interrelatedness of coach / client interactional processes in association with client's self-regulation in client's change process. Therefore, we claim that IRM as a theoretical framework offers a response to the issue of decontextualization of coaching (Cavanagh, 2013) and provides some clarification of the nuanced role of working alliance in the context of client's change process.

Chapter 4 adopts IRM as the conceptual framework for client's change process as influenced by the coach-client relationship by providing a nuanced investigation of the role of working alliance as a moderator. The role of working alliance as a moderator finds support in mentoring (Larose et al., 2010) and counseling (Masdonati, et al., 2014). These coaching-related fields demonstrate that the nature of working alliance can change over time and therefore is likely to produce varying effects on outcomes. Furthermore, the moderating effect of working alliance is coherent with the conceptualization of working alliance in psychotherapy (Safran & Muran, 1998) where the level of trust, bonding, commitment, and shared goal orientation in the

therapeutic relationship is shown to determine effective outcomes. Moreover, the conceptual embeddedness of working alliance as a moderator (Holmbeck, 1997) is supported by change process theory in coaching (e.g. Cox, 2013). However, recent debate about the role of working alliance as a moderator is not surprising. Indeed, contradictory indications about the role of working alliance in coaching may be attributable to coaching in itself being a beneficial process, which may have contributed to how working alliance has been conceptualized as a mediator to explain coaching success in the majority of coaching studies to date (see Chapter 4 for details).

Chapter 4 produces the following key findings on the role of working alliance as a moderator in the change process:

(a) Dyads with low working alliance showed a positive association between movement synchrony and cognitive self-regulation (RoPS), while in dyads with high working alliance, lower movement synchrony was associated with higher cognitive self-regulation (RoPS). This moderation effect can be explained by the relevance of task-setting, goal orientation and bonding in coaching as key influencers, the presence or absence of which requires that movements synchrony repairs a process that is off track in that goals are not clearly set, coaching does not pursue a goal-oriented path that is shared by coach and client, and there is low rapport between coach and client.

(b) The opposite was true for affect balance (PANAS): In dyads with high affect balance, higher movement synchrony predicted higher cognitive self-regulation, while in dyads with low affect balance (PANAS), low movement synchrony predicted higher cognitive self-regulation. This explains the relevance of emotion as a key factor that strengthens the way in which coach and client spontaneously respond to each other as clients feel capacitated to build up their cognitive resources to focus on result-oriented problem and self-reflection. It is recognized that this moderation effect does not relate to working alliance but is found to be relevant to

be reported here as it represents a moderation effect that has not been accounted for but which data analysis can produce as it involves serendipity as an important pillar of successful research (Wick, 2019).

In Chapter 4, we generally highlight that measures of the coaching process indicated that a solid working alliance, a high level of goal-reflection as a key element of cognitive self-regulation, and a predominance of positive mood as a key element of affect balance predict successful goal attainment. Both the key findings on the role of working alliance as a moderator between movement synchrony and client's self-regulation and general findings on measures of the coaching process in relation with working alliance indicate that there is necessity to further study the influencing impact of working alliance on client's change process towards goal attainment. Section 6.2.3 below recommends specific directions for future research.

6.2. Theoretical implications & Recommendations for future research

Section 6.1 in this conclusive chapter provided an overview of the key findings as they relate to the three core themes of this thesis. The present section discusses the theoretical implications of each study providing avenues for future research.

6.2.1 Client's self-regulation as sustained psychological functioning beyond coaching

There is limited research on client's self-regulation as a process variable in coaching. Apart from one recent study (de Haan et al., 2020) which investigated resilience at multiple data points and found that resilience is a factor that contributes to coaching effectiveness across sessions, we have limited understanding of self-regulation (Grant, 2017) as client's sustained psychological functioning as a distinct capacity that support client's development beyond goals in coaching (see Chapter 3 for a detailed discussion).

Based on the findings in Chapter 2, we recommend future coaching research to further explore emotion as a process variable in the coach-client relationship. Apart from that, investigating positive emotion as a predictor of heightened awareness appears to be relevant too. All the more, as positive emotion is posited to be an important factor for action taking in coaching (e.g., Grant, 2014), which is corroborated in the broaden-and-build-theory (Frederickson, 2009). This theory suggests that positive emotions are likely to expand awareness towards new action taking and 'trying out new things'.

The findings in Chapter 3 indicate that there are at least four implications that advance coaching literature on the role of client's self-regulation as sustained psychological functioning in coaching as a change process, as discussed below:

(a) While client's affect balance increases across sessions over time, coaching as a change intervention in itself may have a self-regulatory influence on clients. Each session forms more than the sum of its parts implying that it may be more important for clients 'how well' rather than 'how much more or less' they arrive at regulating emotionally over time. This may explain why change in affect balance is not found to mediate the relationship between personality and authentic self-development;

(b) From a humanistic perspective (Rogers, 1961), goal stability in the context of client's self-regulatory process in coaching may be framed as a i) way of developing continuity and coherence across potentially contradictory behaviors in goal attainment, and ii) client's capacity to integrate their inconsistent behaviors into a coherent self-concept rather than a rigid approach to attaining a specific goal that was identified at the outset of the coaching engagement. Contradictory behaviors may imply that goals are malleable depending on complex situational factors (i.e., clients feel safe in coach-client relationship). They may also depend on the extent to which client's aspirations,

motivations and intentions evolve. So, client's capacity to develop authentically may be about maintaining their stability of goal-directed functioning rather than the stability of a goal per se;

(c) Coaching functions as a complex self-regulatory engagement *per se*. It serves as the key contextual factor in which clients can show up as self-determined individuals to adjust goals in concordance with their congruent self. Repeated goal-orientation and task-setting are more likely to foster client's "continued adjustability" than goal-stability to support clients in 'becoming one' (Sheldon, 2014) in line with their personality in coaching;

(d) Clients experience coaching as a learning process in which they can attain goals with minimal pressure and compulsion (i.e., they feel more "self-concordant" in their goal pursuits) in line with their personality, which implies that self-concordance does not require any self-regulatory resources through affect balance in coaching.

Based on these implications, we formulate authentic self-development as "the process of becoming a continuously congruent self with contradictory behaviors, most probably against someone else's will in our social context. Coaching as a social context indicates a unique self-regulatory intervention that supports clients in their process of 'becoming one'." Subsequently, we recommend future coaching research to explore coaching as a social context in which client's self-regulation is likely to influence client's process of becoming congruent amidst contradictory behaviors and possibly against the will of someone else in their social world.

The findings in Chapter 4 complement the implications and recommendations for possible directions in future research on the role of client's self-regulation elucidated in Chapter 2, 3, and 4. Specifically, the findings in Chapter 4 yield three additional questions that coaching

process researchers may investigate to build knowledge about client's self-regulatory processes in coaching in the future, as follows:

(a) What is the role of client's emotional self-regulation in association with some control factors such as client's social support (Molyn et al., 2019) and client's more distal environment (i.e., sponsors of coaching, Terblanche, 2014)?

(b) What is the potential link between verbal as well as nonverbal synchrony and emotion and how may that link deepen our understanding of the whole body as an important 'signalling' device in emotional processing (Gelder, 2006)?

(c) How does affect balance moderate the association between movement synchrony and cognitive self-regulation?

Consequently, our findings on the role of client's self-regulation in coaching as a change process support a new direction for future coaching effectiveness research (McDowall, 2017) in that we confirm that only longitudinal research can bring to light the role that client's self-regulatory capacities can play in client's goal striving in accordance with their congruent self as the ultimate goal of coaching.

6.2.2 Movements synchrony as a differential interactional phenomenon

Currently, there is limited research on movement synchrony in coaching. Apart from growing evidence-base about the dynamics of movement synchrony in psychotherapy literature (Ramseyer & Tschacher, 2020) as a related field, there is little resources coaching researchers can draw on to understand the role of the dynamic nature of movements synchrony in supporting client's development and growth in coaching (see Chapters 4 and 5 for a detailed discussion).

The findings in Chapter 4 contribute to coaching literature in the following three ways:

(a) Coaching is a dynamic learning process with each coaching session forming more than the sum of its individual parts implying that bonding as an aspect of the quality of the coach-client relationship may determine 'how well' rather than 'how much' coach and client are present synchronizing in each session.

(b) The creation of what we refer to as an authentic environment (as discussed in Chapter 4) in coaching is of greater effect than movement coordination per se as there appear to be way too many factors (e.g., task setting, client's positive affect, result-oriented self-reflection capacity) influencing the coaching process.

(c) Movement synchrony is likely to emerge as a correctional mechanism in dyads. This implication means that high initial movement synchrony does not necessarily imply good contact between coach and client.

Based on these implications, nonverbal interactional processes between coach and client can be defined as presence characterized by authentic motion energy exchange as a form of nonverbal spontaneous responsiveness between coach and client. This definition chimes in with scholarly positions (e.g., Jackson, 2017) that physicality expresses embodied presence, which is important for sharing felt experiences as purposeful meaning making process (Drake, 2015). This conceptualization implies that both coach and client influence 'being with each other' in coaching as a change process. It finds support in Roger Noon's (2018) small qualitative study which indicated that presence is a relational phenomenon, more so than a coach-centered concept as reported by both coaches and clients in the qualitative interviews. Additionally, it complements contemporary concepts that view coaching presence as the coach's way of *'being with clients'* (Divine, 2009; Gendlin, 1969; Linder-Pelz & Hall, 2007; Madison, 2012; Sieler, 2010; Silsbee, 2008; Strozzi-Heckler, 2014) rather than their out-of-the toolbox way of *'doing*

coaching' session-by-session that is likely to make a significant difference in how clients feel capacitated to attain goals in coaching.

The findings on the dynamics of movement synchrony in Chapter 4 support a new direction in future coaching research in the following four ways:

(a) Investigating movement synchrony as an interpersonal phenomenon in the context of working alliance in presence-based coaching (Silsbee, 2008).

(a) Investigating authenticity as a predictor variable as one study in social psychology (Kavanagh, Suhler, Churchland, & Winkielman, 2011) indicates that there is a cost of trust and reputation to mimicking interaction partners. This study corroborates our claims that movement coordination as a correctional mechanism may do more harm than help client's effectiveness in coaching;

(c) Exploring movement synchrony as a key element of client's capacity to engage in goal-directed behavior beyond coaching by investigating this interpersonal phenomenon in conjunction with other variables to complement findings in our investigative efforts;

(d) Exploring movement synchrony by looking into the ways in which synchrony plays out in virtual coaching settings, which was not the context of the present study.

In sum, the study reported in Chapter 4 in this PhD dissertation answers calls from coaching scholars (Myers, 2017) to identify a direction for future coaching process research to focus scientific efforts on exploring the influence of generic factors (e.g., the coaching relationship, client characteristics or coach / client interactional processes) on the coaching process rather than specific techniques associated with any particular method. Specifically, progressing the body of knowledge of generic interactional influences on coaching as a change process has the capacity to improve practice in serving the recipients of coaching who engage in the changing.

Building on these implications and recommendations, the findings in Chapter 5 further advance coaching literature in the following two ways:

(a) Movement synchrony is conceptualized as an embodied phenomenon with the body being the instrument that will indicate the extent to which we are congruent with each other any given moment. Coach's 'way of being present with clients authentically' has the potential to shape client's 'way of being present with the coach authentically'. This partnership ultimately means that presence evokes change in both the coach and the client rather than the client alone as purported by Silsbee's (2008) presence-based coaching theory. This reciprocity implies that a growing congruence between coach and client results in a decrease of movement synchrony in dyadic trajectories across sessions.

(b) Movement synchrony becomes less relevant over time as other factors such as client's autonomy or client's maturity may determine the effectiveness of the change process in coaching. As clients gradually grow autonomous in resolving presenting issues through higher levels of movement synchrony (i.e., as they grow their self-regulatory capacities as discussed in Chapter 4) they will feel less impacted by coach's decreased level of spontaneous responsiveness to their needs. Reciprocally, coaches grow more risk taking in response to clients growing more autonomous in how the latter address challenging issues. Therefore, decreasing movement synchrony is a sign for feeling safe and coach and client can allow themselves to 'make mistakes' without client or coach feeling impacted by any 'ugly' situation engendered by lack of spontaneous responsiveness to either coach's or client's needs.

Based on the implications of the exploratory findings in Chapter 5, we identify the following two synchrony-specific themes that warrant further investigation in the change process in coaching:

(a) the predictive value of the differential downward trend of movement synchrony for coaching presence as an embodied phenomenon with reciprocal impact on coach and client as well as becoming congruent as partners in the coaching relationship across sessions,

(b) the role of the development of movement synchrony in how clients can become autonomous in reaching goals beyond sessions.

Furthermore, we recommend future coaching research to conduct qualitative exploratory studies in the following two areas that reflect how movement synchrony changes in dyadic interactions across coaching sessions:

(iii) exploring synchrony dynamics in the first session as compared to synchrony dynamics in the final session for a specific dyadic trajectory;

(iv) studying a set of dyadic trajectories to explore movement synchrony dynamics in several first sessions as compared to synchrony dynamics in all final sessions of the set of dyadic trajectories under investigation.

Ultimately, we recommend coaching research to conduct comprehensive quantitative process research into the predictive value of client's autonomy for goal attainment through movement synchrony across varied number of sessions as it may be an additional gateway to how we can conceptualize the importance of physicality in presence-based coaching in the future (Jackson, 2017). As such, we urge future research to investigate the relevance of the number of coaching sessions in association with movement synchrony as an interactional phenomenon in coaching.

6.2.3 The role of working alliance in the change process

Currently, coaching literature does not explain the role of working alliance as a moderator between movement synchrony and client's self-regulation capacity. There is need to investigate working alliance as a moderator in client's change process as most recent evidence base in coaching indicates that working alliance is more likely to enhance our understanding of client's change process in coaching if we investigate working alliance a factor that strengthens or weakens the coaching process rather than as a variable to predicts specific coaching outcomes.

Chapter 4 elucidates the key finding reflecting the role of working alliance in client's change process producing the following implication for knowledge building about the relevance of working alliance as a moderator in the future:

(a) In coaching engagements where progress is perceived to "get off track" (i.e., clients experience low cognitive and emotional self-regulation and a poor quality of the coach-client relationship), higher levels of movement synchrony indicated emerging efforts to correct the deteriorating quality of the coaching relationship or the yet unproductive coaching process. In other words, movement synchrony plays a role as an effetive instrument where working alliance is perceived as poor.

(b) Factors specific to working alliance (i.e., task setting, shared goal orientation, bonding) and other moderator variables such as affect balance appear to be more important than movement coordination when it comes to clients striving to build up their capacity to self-regulate in coaching. These interactions patters imply that clients may not feel inclined to trust coach's efforts to sync in with them where they perceive that coaching progress is not characterized by factors specific to working alliance.

Therefore, we recommend coaching research to further investigate working alliance as a moderator rather than mediator variable in coaching process research. This research avenue is likely to advance evidence base of the role of working alliance in client's complex and dynamic change process in coaching.

Chapter 5 extends the implications of the key findings on the role of working alliance in Chapter 4 by elucidating congruence as a key interpersonal factor that needs investigating in coaching process research. Unless clients perceive the coach as congruent in how they respond to client's needs beyond the use of verbal language, they will not experience rapport, trust or empathy (Kolden, Klein, Wang, & Austin, 2011) as crucial components of working alliance (Bordin, 1979). Therefore, we recommend future coaching research to investigate the relevance of the decrease of movement synchrony for working alliance in coaching.

6.3 Implications for coaching practice

Generally, based on the findings as well as in addition to the recommendations put forth throughout this PhD dissertation (Chapters 2, 3, 4, and 5), we argue that coaches need to develop a quality of mind that can grasp the interplay between self and other in the context of coaching as a performance enhancing intervention if we were to progress the body of knowledge in coaching as a context-sensitive area of human relations.

6.3.1 The role of client's self-regulation

Based on the Integrative Relationship Model in the qualitative meta-synthesis in Chapter 2, we propose coaching training providers and coaches to focus on honing coach's capabilities to work with client's affective states as a key factor that is indicated to shape and be shaped by client's cognitive states and behavior in the future. As discussed in Chapter 2, coaching tends to be concerned with behavior-specific outcomes and mindset change as more easily measurable and discernible outcomes, client's emotions have been found to remain not only under-researched but also unaddressed in coaching practice. This is unfortunate, as emotions have been found to drive client's capability to attain outcomes, as shown in Chapter 2. Hence, training coach capabilities in working with the Integrative Relationship Model as it maps the

direct and indirect relationships between emotion, attitude, behavior may contribute to how clients can enhance their awareness of how they can self-regulate emotion, attitude and behavior in their change process. Therefore, we recommend coaching training providers to train and practitioners to practice the capability of how to strengthen client's self-regulatory capacities through working with emotions, in particular working with moods. Specifically, as emotions strengthen or weaken client's capacity to reflect goals when "being with the coach", we recommend paying greater attention to emotion in interactional processes between coach and client beyond any particular coaching methods.

Furthermore, the findings in Chapter 3 imply that coaches need to (a) grow their coaching skills and styles (i.e., capabilities) to engage with client's self-regulatory capacities to enhance client's authentic self-development as the ultimate means to reach effectiveness for clients beyond goals; (b) engage with client's self-perception of competence starting with client's capabilities to increase their goal competence, goal commitment and goal self-concordance towards 'becoming one' at work and in various other contexts, as conceptualized and discussed in Chapter 3; (c) adopt a coaching style that sustains client's balanced affective, cognitive, behavioral and motivational aspects of personality on their path to goal attainment; (d) integrate coaching capabilities that support client's self-regulatory resources towards reaching self-congruent goals; (e) encourage and support clients to be open for new goals rather than stick with goals they believe they 'should' achieve.

Based on the findings in Chapter 4, we recommend coaching practice to create awareness of the role of affect balance as a specific self-regulatory capacity as it influences how movement synchrony and client's cognitive self-regulation interrelate. Coaches need to work with emotions in the coaching relationship in this specific more targeted manner. In doing so, we recommend coaches to work with the whole body as an important 'signalling' device in emotional processing (Gelder, 2006) as emotions manifested in the body have implications for

client's capacity to self-regulate and ultimately their capacity to develop authentically as the ultimate goal of client's personal learning process (Grant, 2012).

6.3.2. The role of the dynamics of movement synchrony

Based on the qualitative meta-synthesis in Chapter 2, we recommend coaching practice to train coaches in working with both verbal and nonverbal interactional processes as key influencing parameters of client's capacity to reach goals effectively. Specifically, building skills in how to discern dynamic patterns of interrelated speech (i.e., coach's choice of question on starting a session; client's choice of words on arriving to the session) and / or dynamic patterns of behavior (i.e., coach's mood prompting specific ways of showing up; client's personality attribute to please coach indicting high level of readiness for coaching) are proposed to be of relevance for coach practitioners on their path towards mastery in the future.

The findings in Chapter 4 imply that there is need to (a) focus on strengthening coach's capacity to identify the quality of the coach-client relationship effectively at the outset of the coaching engagement. This may help use movement synchrony flexibly towards client's capacity to self-regulate in coaching; (b) be and stay spontaneous and flexible throughout the coaching process as it is not worthwhile starting to consciously sync-in with clients as other factors (i.e., task setting, bonding, affect balance) appear to have a weight in how clients move through a regulatory cycle towards goal attainment.

Moreover, based on the implications of the exploratory findings in Chapter 5, we recommend coaching training providers to train coaches in (a) becoming aware of the relevance of movement synchrony as an interactional phenomenon in the coach-client relationship, and (b) observing the nuanced impact that movement synchrony produces on their interactional processes with clients. The aim is to form coach's capacity to differentiate which number of sessions is most likely to impact client's growth in the coaching engagement over time. Finally, we recommend coaching training providers, coaching professional bodies and sponsors of

coaching to advocate the essence of client's autonomy as a result of the growing reciprocal congruence between coach and client through movement synchrony as a criterion for effectiveness in coaching.

6.3.3 The role of working alliance in the change process

The key finding on the role of working alliance as a moderator in client's change process suggests a state-dependent influence of the strength of the working alliance on the relationship between movement synchrony and client's self-regulatory capacities in client's change process. In essence, coaching is a dynamic learning process with each coaching session forming more than the sum of its individual parts. Therefore, we recommend coaching practice to create awareness of and train coaches in working with shared goal-orientation, robust task-setting and bonding in presence-based coaching (Silsbee, 2008) as these aspects of working alliance were found to influence 'how well' rather than 'how much' coach and client need to be present nonverbally synchronizing in each coaching session.

6.4 Limitations

First, the findings presented in this paper form an integral yet distinct part of a comprehensive research project. Given our data maximization approach and in an effort to avoid data slicing (Kirkman & Chen, 2011) in our comprehensive research project, we produced a uniqueness analysis (Kirkman & Rosen, 1999) to provide transparency around the essence of the two investigative approaches we undertook to treat the same dataset in the present project (Table 1, Chapter 1).

Second, a major limitation of the investigative approaches in this thesis was that they were not randomized control trials (RCTs). Without randomization, there are no experimental and control groups to account for equivalence between them, which limits the internal validity

of studies. Instead, the aim was to recruit a large sample enhancing the reliability of findings. We also aimed to gather longitudinal data to meet the purpose of answering he research questions and conducted research in naturalistic conditions to enhance the external validity of investigative approaches.

Third, the effects of objective data may be viewed as overestimated (de Haan et al., 2013) reflecting some motivation on the part of some coach participants to offer validation both to the clients how had agreed to participate in this complex project and the researcher who administered the project. Data may also be viewed as overestimated due to some desire on the part of coach participants to rationalize the time commitment and effort they invested to complete the research project successfully (Baumeister & Alghamdi, 2015).

Fourth, there are differences in the group size in terms of number of sessions that dyads completed, which may skew the results as there is no conformity among dyads. However, as the aim of the naturalistic design of the investigative approaches was to ensure that dyads do not reflect laboratory settings but that they reflect coaching processes as they naturally occur, we took into full account the potential risk of eventually losing data. To offset this risk, the researcher's strategic approach was to recruit as many coach-client dyads for the sample as possible to eventually arrive at a minimum sample size of $N = 150$ coach-client dyads that would complete the process in full alignment with the research parameters and requirements. The time frame for recruitment was set at max. 8 months, after which recruitment was closed. From the sample of $N = 198$ coach-client dyads originally recruited for the project, a final sample of $N = 176/184$ completed the coaching engagement in line with the requirements of the research project. Therefore, drop-outs were automatically excluded from the sample.

Fifth, there may be confounding factors that negatively affected results (e.g., dyads experienced some additional stressor such as changing life conditions in the course of the data collection phase). Despite this specific limitation, we were able to keep coach-client dyads in the coaching process with only two dyads reporting to leave the process (i.e., in one case, the

client opted out for private reasons and in the other case, the coaching engagement was terminated prematurely due to the coaching goal being reached earlier than contracted; in both cases dyads factually completed their process in line with the research requirements completing questionnaires, and data produced by these dyads could be included in data analysis).

6.5 Conclusion

This PhD dissertation comprises four specific investigative approaches (see Chapter 1 for details). The specific set of four approaches was selected to account for four key methodological challenges that some scholars (e.g., Myers, 2017) report coaching process research has encountered so far. First, to provide a possible avenue for a more comprehensive picture of coaching as a change process (Cox, 2013), we provided a conceptual framework that (a) comprises parameters which have been argued to be highly relevant in the extant coaching literature (see Chapter 1 for details); and (b) includes both the mediation and moderation model to account for methodological variance. Specifically, we included factors that relate to the client and coach/client interactional processes as predictor variables, working alliance as a moderator, self-regulation as a mediator (and in one investigative approach as a moderator as a result of the nature of the in-depth data analysis), and goal attainment defined in two distinct ways as conceptualized in goal attainment literature in coaching (Gregory et al., 2011, Grant, 2012). As a result, drawing on conceptual work by Myers (2017), this thesis defines the coaching process as 'a complex dynamic change process with emergent self-organizing characteristics of the client as intrapersonal sub-processes, coach/client interactional behaviors as interpersonal sub-processes, the quality of the coaching relationship as a moderator of these sub-processes, goal attainment as the client's ultimate capacity to become autonomous beyond coaching in coaching itself as a contextual factor with self-regulatory quality in a single session or over a series of sessions'.

Second, in applying both a qualitative and quantitative methodological design in our set of four approaches, this thesis seeks to contribute to advancing literature on coaching process research towards a more holistic theory-building design (Myers, 2017).

Third, in providing a considerable contemporaneous sample size for data analysis in the two hypothesis-testing studies, it is hoped that this thesis achieved generalizability of findings towards building a deeper understanding of the nature of coaching as a change process.

Fourth, in using a validated software-based approach to objectively analyzing video-taped sessions to investigate coach/client interactional processes and in combining the analytical results with client self-report data, this thesis attempts to account for the possible limitations of outcomes obtained through coach/client self-reports only.

In sum, in applying a methodologically comprehensive approach through a qualitative meta-synthesis, a large-scale international study comprising two hypothesis-testing approaches to exploring the change process and an explorative lens, this thesis provides possible avenues for

(a) understanding why clients behave the way they do and eventually how coaching works and why it is effective;

(b) understanding how coaching produces learning for clients over the course of the coaching engagement;

(c) understanding client's change process to support clients effectively in navigating the complex and fluid nature of goal striving and goal attainment in their VUCA world;

(d) supporting coaches in working on the 'edge of chaos' in client's learning to ensure we earn and have client's trust in coaching to enhance coach's reputation in a world that is seeking ever more effective means to deal with change moments.

These avenues can be useful for scholars and practitioners wishing to develop our understanding of the evidence for the effectiveness of coaching as a change process both in coaching psychology and management development in a systematic manner beyond the impact of selective variables in input-output approaches (Myers, 2017).

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Appendix

Table 2.1.
Qualitative Meta-Synthesis Process Overview (Sandelowski Barroso, 2007); guided by Tong et al. (2012)

No.	Protocol steps	Analytical Goal	Procedure	Outcome to build a theoretical contribution
1.0	Research question	Providing an explicit statement of the question the qualitative meta-synthesis will address: conceptually embedding the meta-synthesis in coaching process	A priori specification; PICOD mnemonic to construct a clear, specific and meaningful question for the qualitative meta-synthesis	A well-specified review question heavily guides the search strategy and faciliatates extracting appriopriate data from primary qualitative studies
	Rationale	Identifying the synthesis methodology which underspins the systematic review: explaining the purpose of the study	A priori specification	A rationale enables the meta-synthsis to be set in the context of existing evidence (and theory) and its practical applications
2.0	Sytematic literature search	Locating the body of coaching process research to prevent the exclusion of key information; describing a search strategy, including planned limits	Exhaustive and iterative strategy; purposive sampling: formulating main and complementary search steps; constant reevaluation of the search terms or time frame; forward citation;	A sample of 128 peer-reviewed studies published in 39 English-language journals; clear documentation of search strategy, number of hits, and duplications is vital to ensure robustness and
3.0	Selection of articles	Defining the process for selecting studies in each phase of the synthesis to appraise the quality of primary qualitative studies	Independent reviewing by two co-authors in supervision; CASP criteria: weighting in 3 levels in screening by title, abstract, full text review; adding	Publication of the quality appraisal results in a database; determining rigor, credibility, and relevance of qualitative studies
	Eligibility criteria	Specifying, applying and presenting twelve precise study characteristics as inclusion & exclusion critera to determine the studies to be included	Developing an inclusion/exclusion criteria list and reporting characteristics	95 articles finally incorporated in the meta-synethsis ensure reliability in providing an integrative framework of client factors and contextual factors evident in findings;
	Information sources	Describing all sources relevant for answering the review question; providing a rationale for using those data sources	Downloading full-text version of articles; compiling a list of electronic databases, bibliographic lists, generic sources, and digital theses as grey literature sources	Presenting draft strategy including planned limits to ensure transparency and dependability
	Data management	Describing mechanisms used to manage records for an accruate audit trail	Creating a single data hub; identifying data integration points; audit trail memo	Muliple-source data allows for aligning the collection strategy with the review question/objectives
	Methodical rigour	Identifying risk of bias in individual studies to enquire into how to treat qualitative research in terms of	Creating a list of bias items: publication bias, self-reporting, analytic approaches in qualitative designs, linguistic	Deferral of final decisions about inclusion of some studies until the analysis stage in line with the purpose of the meta-synthesis

Table 2.1.
Qualitative Meta-Synthesis Process Overview (Sandelowski Barroso, 2007); guided by Tong et al. (2012)

No.	Protocol steps	Analytical Goal	Analytical Procedure Used	Outcome to build a theoretical contribution
4.0	Data collection	Identifying the studies screened; reading and re-reading full texts; presenting study characteristics and insights of the primary studies in a dialectic process	Developing and presenting a clustering and coding form for concepts; multiple coding runs across all study types and checking for corresponding matches	Deriving coded concepts: categorizing qualitative study-specific evidence; sensitivitiy for contextual considerations; using validated coding form
	Data extraction	Identifying the most influential descriptors and variables to be reported as influential in coaching; identifying data assumptions and simplifications	Line by line identification; juxtaposition of extracts with source; co-author review; inductive approach; cross-case displays of keyelements of information	Using a system by which methodological, contextual and evidential information can be compared to ultimately faciliate multiple case analysis and synthesis
	Risk of bias of individual studies	Re-reading addresses the feasibility or appropriateness of synthesizing qualitative research to avoid superficial reporting	Returning to the in-depth descriptions of context and information reported in primary resarch	Addressing the issue of taking data out of the studies' unique contexts from which the meta-synthesis was constructed
5.0	Data analysis & synthesis	Producing an integrative interpretation of findings to ground theory on emerging concepts	Three-stage thematic analysis; interpretive synthesis; inductive approach; open, axial, and theoretical coding	Clarifying concepts, categories, and themes in refinement of existing knowledge and emergent operational models
	Analysing by study type	Describing themes and equencing variables as they are found to be influencing each other in each study	Constant thematic comparison; abstracting descriptions from context; interconnectivity of factors specific to	Coding themes abstracted from context and study type help identify theoretical saturation as a basis for conceptualisation
	Synthesizing on an across-study level	Accumulating all the interrelated patterns at a cross-study level to contribute to meaning; integrating contextual factors	Integrative Relationship Model; constant comparison across studies of direct and indirect interrelationships	A comprehensive explanation of how all factors interrelate; deeper understanding of the coaching process
	Outcomes and prioritisation	Applying abstraction process to organize themes/categoires of client experiences to construct theory	Relating seemingly disparate aggregate dimensions to each other in six interrelated dimension pairs	Understanding how clients and contexts influence the change process, translating dynamic interrelations into effectiveness
	Building theory from meta-synthesis	Producing a theoretically informed interpretation and reconstruction of a perceived interconnectivity of client factors and contexts in the immediacy of coaching	Linking the results back to the literature on coaching process research based on existing theories	Identification of clients' emotional aspects to have a perceived direct relationship with cognition and behavior to explain when and how clients engage in coaching as a socially constructed change process

Table 2.1.
Qualitative Meta-Synthesis Process Overview (Sandelowski Barroso, 2007); guided by Tong et al. (2012)

No.	Protocol steps	Analytical Goal	Analytical Procedure Used	Outcome to build a theoretical contribution
	Meta-biases	Identifying findings from primary studies that seemed to not fit within the current array of concepts, categories, themes, and emergent theory to test the coherence of the preliminary interpretive	Logging the new qualitative differences; adding to or modifying the developing sets of codes and dimension categories	Accounting for variations with certain thematic or methodological characteristics: adjusting the emerging theory to include divergent findings
	Confidence in cumulative evidence	Identifying which differences, if any, the methodological, contextual, client-related choices in the primary articles made in relation to the emerging theory	Theoretical sampling	Ensuring generalization to a transcending process
6.0	Quality control	Making continuous attempts to create transparency around the steps in the meta-synthesis	Creating transparency throughout the process through descriptions and explanations for decisions taken; incorporating established methods to synthesize primary qualitative studies; utilizing established quality appraisal tools; employing electronic and manual search strategies; using an audit trail for documenting decisions and agreements negotiated with co-reviewers.	Ensuring 'best practices' for maintaining quality control in qualitative meta-syntheses in coaching psychology
7.0	Presenting findings	Articulating the meta-synthesis, which in this systematic qualitative meta-synthesis is in the form of thematic synthesis coupled with the interpretive synthesis approach	Conceptualization of the interconnectvity between client factors and contextual factors and the relatedness of each factor to this theoretical framework in the findings section; narrative presentation	Sharing detailed themes, concepts and categories, and concepts derived from the matasynthesis by supportive quotes from various primary qualitative studies to sustain the claims in the meta-synthesis
	Discussion	Discussing the results of the meta-synthesis and potential limitations	Discussing rigour, reliability, and validity	Legitimizing the validity and reliability of the procedure and activities used for the dependability and trustworthiness of outcomes

Notes.
[a] PICOD = population, the phenomena of interest, the context, the outcome of interest and design
[b] CASP = Critical Appraisal Skills Programme: a) the research design, b) sampling strategy, c) data collection method, d) researcher reflexivity, e) ethical considerations, f) rigour of data analysis, g) clear presentation of findings, h) relevance and trustworthiness of research for each study

Table 2.2. Summary table of primary qualitative studies reviewed in the qualitatitive meta-synthesis

Type of study - Case Study - Title	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
Executive coaching and REBT: Some comments from the field	Anderson, J. P. (2002)	Journal of Rational- Emotive & Cognitive-Behavior Therapy	7 executives	phenomenological	behaviours caused by a lack of self-worth; clients readily understand and able to effect changes in behavior; brilliant, very quick-minded / little tolerance for those not performing, the judge of their competence / consequently difficulties with relationships; very intense and prone to holding 'must' beliefs impact behaviour; perfectionism consumes resources and may determine a failure to meet deadlines; products of efforts have high quality and tend to reinforce strivings to be flawless; perfectionism often arises with issues of self-worth, which in turn aggravates workplace difficulties; focus on psychosocial work environment and organizational efficiency could contribute to lower employee stress, and better organizational performance
Coaching the entrepreneur: features and success factors	Audet J. & Couteret P. (2012)	Journal of Small Business and Enterprise Development	6 coaching initiatives	grounded theory	attitude to change (openness to change & receptivity to coaching, entrepreneur looks out for consultant or does not accept coach; commitment to the relationship); learning begins to cast doubt on methods and self-awareness; there is inconsistency in the discourse and the behaviour
Coaching for a vision for leadership: Oh the places we'll go and the things we can think	Bell, M. & Habel, S. (2009)	International Journal of Reality Therapy	1 executive	heuristics	character attributes of servant leaders in motion; willingness to look into 'who I am' increasing the level of self-awareness (as success factor and outcome)
Coaching: the successful adventure of a downwardly mobile executive	Blattner, J. (2005)	Consulting Psychology Journal: Practice and Research	1 executive	heuristics	trust, capacity to connect to emotional self/self-reflexive capacity, willingness and openness to learn and develop and/or to take risks especially in clients with anxiety determin behavior
"It can be life-changing": An interpretative phenomenological analysis of the coach and coachee's experience of psychometrics in coaching	Buckle, T. (2012)	International Journal of Evidence Based Coaching and Mentoring	3 coaches and 3 coachees	heuristics	relationship emerges as the most critical aspect of the coaching and potentially a pre-requisite to introduction of a psychometric; potential for coaches to require knowledge and skills that are currently neither provided in coach training nor in psychometrics training
Coaching at relational depth: a case study	Day, A. (2010)	Journal of Management Development	1 case	heuristics / double-hermeneutics	participation in unconscious organizational dynamics shape client's experience of role and the extent to which coaching can be effective evoking feelings of powerlessness and anger; coach initially identified with these feelings because of own relational past; as a result, relationship became stuck in repetitive dynamic which could be understood as an expression of stuck dynamics in organisation around unconscious management of anxieties within its management structures.
An iterative approach to executive coaching	Diedrich, R.C. (1996)	Consulting Psychology Journal: Practice and Research	1 case	heuristics	readiness to change (as coachee worked hard) of an autocratic and coercive manager (troubled leader) and the coaching process had motivational influences on learning from the Learner-Centred Psychological Principles; three "social motives" (achievement, affiliation, and power)—those non-conscious needs, wants, and concerns—that drive and direct behavior / view behavior as a function of both role and personality; that is, observed behavior exists as a proportion of two types of performance: role relevant versus personality relevant
Eye movement desensitization and reprocessing: Four case studies of a new tool for executive coaching and restoring employee performance after setbacks	Foster, S., & Lendl, J. (1996)	Consulting Psychology Journal: Practice and Research	4 cases	phenmenological	desensitization of disturbing incident shifted negative view to more positive one. Work performance was restored or enhanced. In the 4th case EMDR appeared to decrease anxiety about job interviewing and the participant reported a satisfactory result
Executive consulting under pressure: A case study	Freedman, A.M. & Perry, J.A. (2010)	Consulting Psychology Journal Practice and Research	1 case	heuristics	readiness and willingness to accept coach in the face of suspicion and lack of trust in process as well as 'power' perceived through pressures in the organization to deliver higher performance levels - feeling driven by crisis to quickly achieve tangible results with insuffi- cient time to reflect, analyze, learn, and modify his strategies and plans
Future female talent development	Garcea, N., Linley, A., Mazurkiewicz,K., Bailey, T. (2012)	Strategic HR Review	2 female cohorts	grounded theory	strengths awareness as a predictor of capacity to deliver on goals and ability to influence / ''imposter syndrome'' (Jarrett, 2010) leading to low achievement

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Salutogenisis and coaching: Testing a proof of concept to develop a model for practitioners	Gray, D., Burls, A., & Kogan, M. (2014)	International Journal of Evidence Based Coaching and Mentoring	5 cases	phenomenological	rational-emotive behavioral effects
CEOs on the couch: Building the therapeutic coaching alliance in psychoanalytically informed executive coaching	Huggler, L.A.A. (2007)	Dissertation	6 CEOs	grounded theory	narcissism and affect containment; influenced by collaboration via trust, through coach's empathic attunement client builds up trust, and transference phenomena such as idealizing (seeing the coach as all wise and perfect), mirroring (wish to be loved and admired by coach), twinship (wish to imitate and be like the coach), and negative transferences; trust impacts capacity to collaborate
Development coaching: Helping scientific and technical professionals make the leap into leadership	Hurd, J.L. (2009)	Global Business & Organizational Excellence	4 executives	grounded theory	four shared characterstics of scientific / engineering professionals as challenges for them: strong identification with who they are, love of creativity and independence in thinking and action as well as technical expertise as attributes are potential challenges when transiting to leadership positions; willingness to try out new behaviour is essential for change through coaching / eagerness and openness to feedback
A case study of executive coaching as a leadership intervention in a bureaucratic organization	Ingram, C.L. (2004)	Dissertation	56 middle managers	grounded theory	dominance, influence, steadiness, cautiousness are these attributes affected by leadership training and leadership coaching; job self was assessed as criterion
Model agility: Coaching effectiveness and four perspectives on a case study	Kauffman, C., & Hodgetts, W. H. (2016)	Consulting Psychology Journal: Practice and Research	1 case / 4 perspectives	phenmenological	agility translates into different questions and formulations of the coaching engagement
Coaching's 'good hour': creating tipping points	Kets de Vries, M.F.R. (2013)	Coaching: An International Journal of Theory, Research and Practice	1 leader	grounded theory	when coupled with willingness to look at stuck situations with different eye tipping points can occur (Aha moments); these quantum changes in clients' lives contribute to meaningful life decisions;; ability to detach their symptoms or behavior patterns from other areas of functioning. In context of transference cure, preparedness to look at things in a new, more constructive way; preparedness to live life with greater authenticity and purpose lead to tipping points; lack of motivation to take the next step; readiness to start to play with ambivalence, to experiment with small change efforts; readiness to accept the need for change; authenticity
Coaching at the top	Kiel, F., Rimmer, E., Wiliams, K., & Doyle, M. (1996)	Consulting Psychology Journal: Practice and Research	1 leader	grounded theory	psychological mindedness of coachee , trust, individual's past, personal life, and work environment influencing outcome; hidden agendas likely to lead to resistance; fears of losing winning formulas; fear of change leading up to resistance / leadership effectiveness
Coaching and Executive Character: Core Problems and Basic Approaches	Kilburg, R.R. (1997)	Consulting Psychology Journal: Practice and Research	1 case	grounded theory / phenomenology	executive character as complex adaptive system that influences unconscious aspects of organizational behaviour and challenges of changing executive character; unconscious psychological conflict in individuals, work groups, and organizations often impedes executive and organizational performance
When shadows fall: Using psychodynamic approaches in executive coaching	Kilburg, R.R. (2004)	Consulting Psychology Journal Practice and Research	1 case	grounded theory / phenomenology	attachment styles, event, feelings, thoughts and patterns of behaviour outside of the awareness signficantly influence what they decide and how they act; emotional maturity facilitates effectiveness of coaching; readiness, openness, willingness and emotional maturity influence coaching process
Narrative 360° assessment and stakeholder analysis: How a powerful tool drives executive coaching engagements	Koonce, R. (2010)	Global Business & Organizational Excellence	2 cases	grounded theory	areas most critical to performance in a particular role and organization
The manager as coach (MAC) as a driver of organizational development	Ladyshewsky, R.K. (2010)	Leadership & Organization Developmnet Journal	74 cases/ 40 female & 34 male	hermeneutics and phenomenology	trust is constructed and creates a level of predictability -> when it comes to decision making: mediated by risk tolerance (will vary according to need for control, personality and culture), level of adjustability (how much time individual needs to build trust), relative power of staff (person asking for trust has little relative power, then they are more vulnerable and may be less comfortable trusting) & situational factors -> relational aspects: 1.) security and how high are the stakes in the relationship, 2.) similarities can include values (personal or organisational), membership in defined groups or personality traits; 3.) how well do interests align with one another. If interests align, trust will increase

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The nature of the internal coaching relationship	Machin, S. (2010)	International Journal of Evidence Based Coaching and Mentoring	3 cases	phenmenological	trust (specifically clients' readiness for change aa constributor to trust in relationship) important for psychological depth and the challenge as well as holding client accountable) factors that characterised readiness included openness, a drive to change, a positive outlook on coaching, inviting challenge, receiving challenge positively, lack of defensiveness and willingness of client to go to uncomfortable places
Executive Coaching and Psychometrics:A case study evaluating the use of theHogan Personality Inventory (HPI) and theHogan Development Survey (HDS) insenior management coaching	Mansi, A. (2007)	The Coaching Psychologist	1 case	grounded theory	dark side and impact on coaching and effectiveness as leaders; when dark sides are coupled with low emotional stability (empathy, level of guilt, anxiety, calmness, trusting, attachment, somatic complaints and even-temperedness) that problems occur as there is little emotional resilience with which to deal with pressure; through extreme levels of volatile behaviour including angry outbursts, hostile verbal and non-verbal communication, moodiness, lack of engagement with others and tendency to anxiety and guilt - potentially disastrous consequences; client felt frustrated easily and let down and then guilty, unrealistic expectations and low tolerance to frustration which manifested through his anger
Executive Coaching: An integrative Model	Orenstein, R.L. (2000)	Dissertation	8 cases	heuristics	unconscious defenses (regression) lead to resistance and impact coaching relationship; forces have unconscious elements that are at least, if not more, powerful than those that are conscious
Executive coaching: It's not just about the executive	Orenstein, R.L. (2002)	Journal of Applied Behavioural Science	3 cases	grounded theory	role of the unconscious in behavior (inner life of the individual being coached, and specific intrapsychic forces (defenselessness, avoidant patterns, controlling patterns) that are triggered by other relations in organization, and organizational role demands; ego achievement in role performance
How cognitive behavioural, rational emotive behavioural or multimodal coaching could prevent mental health problems, enhance performance and reduce work related stress	Palmer, S. and K. & Gyllensten, S.P. (2008)	Journal of Relational Emotive & Cognitive Behaviour Therapy	1 case	grounded theory	client feeling uncomfortable; distorted thinking and difficulty to accept situation leads to slow pace
What factors affect coaching and mentoring in small and medium size enterprises	Peel, D. (2008)	International Journal of Evidence Based Coaching and Mentoring	6 cases	phenomenological	pervasive level of control (decision making and initiative) -> management style can be viewed as significant enabler of coaching and mentoring activity within SME context / owners wield control over decision making and that is as a predictor of outcome; attitude or managerial style of managers/owners as autocratic, egocentric, impulsive and often unpredictable; gender -> female owners spend more time coaching employees; greater involvement of managers in decision making process thereby rendering wholehearted participation as essential pre-requisite to coaching and mentoring success
The Alchemy of Coaching: "You're Good, Jennifer, But You Could Be Really Good"	Peterson, D.B. & Miller, J. (2005)	Consulting Psychology Journal: Practice and Research	2 cases	heuristics	inisight, motivation, preparedness and self-efficacyvaries by personality and other factors like capability and opporutnities to stretch oneself determine behavior, accountability, real-world practice shape behavior from client's and coach's perspective
Executive Coaching: A psychodynamic approach	Sandler, C. (2010)	British Journal of Psychotherapy	3 cases	phenmenological	signs of anxiety at the start of the coaching process / role anxiety plays in coaching process
CEO succession planning in a petroleum exploration company: A case study	Sauer, J. (1999)	Consulting Psychology Journal Practice and Research	1 case	phenomenological analyisis	excessive independence manifests in lack of communication, going it alone style, over-confidence, level of competitiveness and lack of ease in social situations as failure criterion in the face of coaching efforts - coaching was not accepted
Coaching of international managers: organizational and individual perspectives: Article 2: Expatriate Coaching: Factors Impacting Coaching Success	Salomaa, R. (2017)	Dissertation / Journal of Evidence Based Coaching and Mentoring	25 expatriates	phenomenological	factors critical to coaching success of expatriates: coachability (the coachee's openness and willingness to be coached); managerial leadership style impacts coachability and coaching success;

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The most effective factors in executive coaching engagements according to the coach, the client, and the client's boss	Seamons, B. L. (2006)	Dissertation	8 cases	hermeneutics	client adherence (willingness to engage in coaching) from coach's and superior's perspective as most effective success factors determining engagement in coaching
Perceptions of Managerial Coaching within Selected Workplaces	Seifert, L.L. (1995)	Dissertation	small size managers	phenmenological	perceptions of managerial coaching and subordinates' perception of managers coaching subordinates and implications
The benefits of a leadership program and executive coaching for new nursing academic administrators: One college's experience	Smith-Glasgow, M., Weinstock, B., Lachman, V., Dunphy Suplee, P., & Dreher, H. (2009)	Journal of Professional Nursing	4 cases	phenomenology	apprehension about being coached rooted in her sense of vulnerability and mild skepticism about whether "professional coaching" could be effective; by the end of coaching client was satisifed
The effectiveness of executive coaching in the development of emotional intelligence competencies	Sullivan, M.A. (2006)	Dissertation	8 executives	hermeneutics	clients' openness to learning, chemistry between coach and client, relevance of coaching to the work of clients likely to impact the effectiveness of coaching process
Coaching executives	Tobias, L. L. (1996)	Consulting Psychology Journal: Practice and Research	1 case	phenmenological	the greatest danger in coaching individuals from organizations is the possibility that psychologist may inadvertently participate in scapegoating by an organization or by a boss who is unable or unwilling to look deeply enough at ways that environment may be supporting the conditions underlying client's seemingly maladaptive response. The more removed the coaching is from the organizational context, the more pains psychologist must take to ensure that context is woven into the fabric of coaching relationship and that organization be persuaded that it, too, needs to play a role in defining and achieving the desired outcome
The case for eclecticism in executive coaching: Application to challenging assignments	Turner, E. & Goodrich, J. (2010)	Consulting Psychology Journal: Practice and Research	2 cases	phenomenological	problems due to emotional and behavioural responses (volatile traits, emotional excess or 'expansive executives, components being a drive to overachieve due to anxiety about self-worth/fear of failure), unconscious defenses, lack of capacity to develop insight might impede effectiveness and contribute to poor or less-than-optimal performance or termination of coaching (not all clients with emotional excesses can be helped). Other traits: intense self-focus on personal performance, goal-driven behavior to which they are totally committed, demanding behavior not only of themselves but also of coach and others, continually striving for improvement, and sometimes feeling isolated and lonely: resulst: expansive executives cannot take feedback and withdraw or become enraged
Quantitative and qualitative processes of change during staff-coaching sessions: An exploratory study	van Oorsouw, W.M., Embregts, P., & Bosman, A. (2013)	Research in Developmental Disabilities	3 cases	grounded theory	drive to stay in control results in resistance to change; self-efficacy determines attitude, style and connection with coach (and clients); capacity for insight low and is takes coach several repetitions to achieve insigh; discipline to follow through tasks impacts effectiveness; initiative results in faster insight (from unconscious competence to conscious competence); ability or insecurity and willingness to adopt or resistance to an open and vulnerable attitude at start of coaching process impacts balance of power in coaching process and conversational power
Managerial growth: a coaching case study	Wade, H. (2003)	Industrial & Commercial Training	1 case	phenomenological	ability to give direct feedback (wants, needs, goals) and commitment to coaching resulted in fast progress and change in behavior
Executive coaching: An outcome study	Wasylyshyn, K.M. (2003)	Consulting Psychology Journal: Practice and Research	87 cases	phenmenological	enotional competence, self-efficacy as a learning and behaviour change vehicle among others are indications of successful coaching engagements, which executives are most likely to benefit from this development resource and presents a typology for gauging issue
The reluctant president	Wasylyshyn, K.M. (2005)	Consulting Psychology Journal: Practice and Research	1 case	grounded theory	reluctancy, narcissism and toxic micromanagement but willingness to learn, courage to change, perception of the need for change as one of life's continuous gifts. Lack of trust compensated with client's appetite to learn, willingness to invest sufficient time, and the potential for coach and client to form a strong working alliance

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Patterns of Leadership Behavior: Implications for Successful Executive Coaching Outcomes	Wasylyshyn, K.M., Shorey, H. & Chaffin, J. (2012)	The Coaching Psychologist	300 cases	grounded theory	feelings of 'unrequited' work (Wasylyshyn, 2008) as a perilous (mixed success in coaching) or toxic (short on self-awareness, did not modulate emotions well, lacked empathy, and their relationships were more cool, distant and transactional) behaviour pattern impacts leaders' eligibilty for coaching (they may or may not be viable coaching candidates), as opposed to remarkable patterns (better able to integrate their left brain analytical strengths with right brain relationship-building capabilities and better able to leverage emotional intelligence); remarkable, perilious or toxic leadership behaviour require different coaching approaches
Effectiveness of a High-Potential African American Executive: The Anatomy of a Coaching Engagement	Winum, P. C. (2005)	Consulting Psychology Journal Practice and Research	1 case	phenomenological	enthusiasm and openness of client lead to person-specific attributes and capabilities of the executive and the context in which the executive is operating -> leadership effectiveness (Saporito, 1996): faltering executives and diversity issues (race and identity: warring soul at peace -> self-identify always includes race) as salient fatures of coaching
A qualitative investigation of the implementation of an internal executive coaching program in a global corporation, grounded in organizational psychology theory	Yedreshteyn, S. (2009)	Dissertation	18 cases	grounded theory	looking at stuck situations with a different eye, interest to receive feedback: positively impacted by ability of clients to detach their symptoms or behavior patterns from other areas of functioning & preparedness to live life with greater authenticity and purpose & readiness to start to play with their ambivalence & willigness to experiment with small change efforts & readiness to accept the need for change; negatively impacted by lack of motivation to take next step
Article - Interview	**Author**	**Journal**	**Number of participants**	**Research paradigm**	**Verbatim of client factors and contextual factors**
The characteristics of dyadic trust in executive coaching	Alvey, S. & Barclay, K. (2007)	Journal of Leadership Studies	27 executives	phenmenological	willingness to disclose leads to trust (and when client is met with non-judgemental reaction) client readiness and unreadiness (receptivity to feedback and change) as strong factors contributing to trust development, client's perception of orgnizational 'stigma' / context; Trust was highest when (a) the client was willing to disclose honest feelings and thoughts and was met with a supportive, nonjudgmental reaction from coach; (b) the organization was supportive of positive leadership development that could occur in coaching; (c) coach and client were clear about expectations of confidentiality and outcomes; and (d) coach supportively confirmed client's developmental needs, and challenged client's leadership behaviors;(characteristics of coaching relationship)
A model of executive coaching: a qualitative study	Augustijnen, M.T. Schniter, G., Van Esbroeck, R. (2011)	Psychology Review	10 executives	grounded theory	self-reflection (willingess to reflect on themselves & trust) -> two central variables are: (a) the relationship based on trust between coach and coachee; and (b) openness to coachee introspection
Self-deception in coaches: An issue in principle and a challenge for supervision	Bachkirova, T. (2015(	An International Journal of Theory, Research and Practice	6 supervisors	narrative / grounded theory	What the effect of it was that actually client was led to believe that coach shared their views, because there was never any challenge of those views, because coach was so busy protecting this notion that "I can work with it, it's ok"; I can deceive myself that I'm doing this because my client is not fulfilling their potential. Therefore I need to help them be more ambitious. ...actually it's my need to have a client that is more successful so that I can feel that my coaching is more worthwhile and I feel I can make a difference'.
Coaching executives as tacit performance evaluation: A multiple case study	Ben-Hador, B. (2016)	Journal of Management Development	79 interviews with all parties involved	phenmenological	hidden agenda often present in the organization: that of assessing and influencing the managers through coach; Transfer to workplace and no interference from workplace come out as important factors to overcome hidden agendas; Hidden agendas and politics are perhaps more important than we think as well as transfer to workplace
Client perceptions of effectiveness in executive coaching	Bush, M.W. (2005)	Dissertation	small size executives	phenmenological	clients' willingness to be coached, motivation and commitment, openness to the process
Perspectives on effective coaching by those who have been coached	Carter, A., Blackman, A., Hicks, B., Williams, M., & Hay, R. (2017)	International Journal of Training and Development	296 coachees	phenmenological	strong working alliance, particularly in terms of "agreement on tasks and goals initiated by the coachee," led to better goal attainment (supporting many quantitative studies and also what coachees report about serious barriers when there is no agreement on goals; collaboration; coachees' own readiness and engagement, coaching experience;

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Executive coaching expericnes: a systems psychodynamic perspective	Cilliers, F. (2005)	SA Journal of Industrial Psychology SAJIP	7 executives	phenmenological	initial discomfort in coping with limited structure in experiential executive coaching design lead to flight reactions as a defence mechanism. When clients let go of defences, learning became more personalised and owned as if they had to go though some kind of psychological birth process in trusting coach as an outsider looking inside towards their environments, situations, personal experiences. The resulting trusting relationship showed clear evidence of self-empowerment. Sievers (2002) referred to dynamics of trust being embedded in the level of meaning participant experiences in relationship and accompanying hope to sustain interaction and learning. This was evident in references to finding deep meaning in here-and-now of learning event and application of learning in their work teams.
Coaches' experience of critical moments in the coaching	Day, A., de Haan, E., Blass, E., Sills, C. & Bertie, C. (2008)	International Coaching Psychology Review	28 coaches / 49 critical moments	phenomenological	critical moments characterised by intense emotions (anger, sadness, aggression, sadness or fear, anxiety) leading to critical moments / relationship; outcome of moments influenced by coach's containment of their and client's emotions; containment involved coaches being aware of own emotions and reactions of client, making a link with what was taking place in relationship and reflecting on experience with client in a manner that led to heightened awareness for client; where distancing occurred, this was associated with either aggressive response or avoidant response by one or both parties (behaviour or reaction of client towards them (including anger or criticism directed towards coach, unrealistic requests, physical threats, emotional distress and unhealthy behaviour
I doubt therefore I coach: critical moments in coaching practice	de Haan , E. (2008a)	Consulting Psychology Journal: Practice and Research	49 coaches / 56 critical moments	phenmenological	transference and external tension stemming from coachee's emotions and attitudes (confidence in and acceptance of coach & coaching, transference (e.g. strong feeling for coach), openness and readiness for coaching) and doubt as the overriding form of tension for inexperienced coach; quality of coach is displayed through the ability to remaining calm, open, and authentic even in a situation of pregnant, even existential questions and doubts; illusion of being able to direct coaching is one of defenses against presence of unpleasant tensions and doubts; effectiveness of coaches seems determined primarily by their ability to doubt, not to know what is coming next, and to greet what comes next with questions.
I struggle and emerge: critical moments of experienced coaches	de Haan , E. (2008b)	Consulting Psychology Journal: Practice and Research	47 coaches / 78 critical moments	phenmenological	transference and external tension (external tensions (stemming from the coachee's material and presentation: flattery, working hard for coach, competition with coach, "using" coach for nonlearning purposes, or "flights into health" during coaching) obstruct coach only if they give rise to internal tensions, that is, if they influence the coach's ability to put things into perspective, detachment and patience); evidence of unpredictability (turning point, Carlberg, 1997) and a deeper emotional meeting (Stern, 2004), either positive or negative; quality of an experienced coach's work is determined primarily by ability to tolerate tension and deliberately inquire into tensions within coaching relationships
Critical Moments of Clients of Coaching: Towards a 'Client Model' of Executive Coaching	de Haan, E., Bertie, C., Day, A., Sills, C. (2010)	Academy of Management Learning and Education	14 coaches, 21 coachees reporging 86 critical moments	grounded theory	new realisations and insights as most critical in cllients' direct experience of coaching; internal process / state of mind (anxiety, expectations) of clients tells us something about 'what the client wants' / 'what moves the client' = critical moments are about personal realisations (both about issues and about self) and those that are about specific behaviours of the coach (both directive and facilitative interventions);
Differences between critical moments for clients, coaches, and sponsors of coaching	de Haan, E. & Nieß, C. (2015)	International. Coaching Psychology Review	49 coachees / 177 critical moments	grounded theory	differences in mindset - insight-focused (client) ideology are related to self and coaching objectives, themes; person-focused (coach in moments of rupture) ideology characterised by anxieties, emotions, doubts; problem/solution-focused ideologies (sponsors) characterised by more action-, behaviour- and future-oriented realisations; differences engendered by roles taken in/around sessions, those of client, coach and sponsor changes on the inner layers of metaphorical onion (i.e. understanding, self-awareness); moments of realisations and insights; sponsors notice positive changes in relationship and in clients' communication, interpersonal skill (interest in changes in relationship with colleagues)

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Spiritual influences on individual optimal performance at work	Dupuis, M.A. (2004)	Dissertation	13 coachees	phenomenological	spiritual perspective (orientation) impacting work and leadership performance and how coaching facilitates optimal performance; personal spiritual orientation in workplace caused participants to lead from the inside out; senior women in leadership in touch with their center of knowing; orientation was achieved through a connection to intangible force that guided them to conscious, purposeful action; drawing on an intangible resource available to everyone
Executive coaching: what is the experience like for executive women?	Galuk, D. (2009)	Dissertation	10 executives	hermeneutic phenomenological	insight to action (feeling alone and wanting help, seeking out coaching as a way to open oneself up to more challenge and growth rather than to make behavioural changes, motivaton by challenge and growth), feelings about learning and coaching (driven by trust in coach, professionalism, expectations to be guided, strengthened by coach to take different action), commitment to development process leads to self-discovery, awareness, challenges to thinking, different actions get better results, being more effective with people, work life balance, how to work with boss and gender-based differences, feelings about coaching and learning are important, workplace context provided gender-based differences (not discussed)
Choosing an executive coach: The influence of gender on the coach-coachee matching process	Gray, D.E. & Goregoakar, H. (2010)	Management Learning	201 SME managers / 22 coaches	phenmenological	gender preferences for coaches between male (role model of business success) and female (sensitive issues) for different reasons; the influence of gender on the coach-coachee matching process
Coaching SME managers: Business development or personal therapy? A mixed methods study	Gray, D. E., Ekinci, Y., & Goregaokar, H. (2011)	The International Journal of Human Resource Management	46 coachees at the top of SMEs / 10 coaches	phenmenological	awareness of action to take, but unsure, procrastinating: 'I wasn't able to take the company forward because I'd sort of 'plateaued'. 'I needed somebody to bring in, take me forward a bit and I think that's how it seems to work'. Boosted self-confidence, motivation helped in decision-making: 'we talked about confidence and positioning and getting your head right and some of the softer things I suppose'; coaching worked as career retention: 'I've had a tendency to move around but I can't do that anymore'. 'She helped me reorganise my work life and do things that are motivational'; coaching was life-changing: perceptions of coaching as personal development lead to lack of transfer to workplace
Coaching unemployed managers and professionals through the trauma of unemployment: Derailed or undaunted?	Gray, D. E., Gabriel, Y., & Goregaokar, H. (2015)	Management Learning	13 managers	phenmenological	positive relationship between managers' attitudes toward coaching and their ability to learn from their trauma: lack of trust, even in some cases cynicism determine ability to learn
The Coaching Relationship: An Interpretative Phenomenological Analysis	Gyllensten, K. & Palmer, S. (2007)	International Coaching Psychology Review	9 cases	phenomenological	skepticism and initial uncertainties influenced by trust; influenced by feeling comfortable given the confidentiality, trustworthniness and transparency of coach; trust as a predictor, rapport (for valuable coaching relationship)
Adjusting the mirror: Strategies for coaching executives with narcissistic personality features	Hughes, J.L.(2003)	Dissertation	14 psychologists / coaches reporting about 3000 coachees	grounded theory	narcissistic features: competitive visionary, innovative, charismatic; at healthy end effective, efficient, those on pathological end unsuccessful because of sense of grandiosity, envy, tendency to devalue those who disagree, poor empathy, sensitivity to criticism, low tolerance for frustration, and potential for paranoia; constructive, self-deceptive and reactive narcissist; impact on coaching (long term coaching, 4+ years is required and executives must be highly motivated); lack of deep conviction around narcissist's own values allows them to thrive in a culture shaped by regression (their ideology will unite organization and soothe tensions)
Insight events in coaching sessions	Lightfoot, I. (2019)	International Journal of Evidence Based Coaching and Mentoring	small number of dyads	phenmenological	clients faced pressure to solve personal issue, an answer to which had hitherto proved elusive; dyad was engaged in focused exploration around question; clients suddenly realised that they had answers inside themselves and that it was their responsibility to solve issues. At this moment, a number of factors came together and clients felt a deep sense of relief, with the realisation and insight into how they would solve problem. Increasingly becoming more positive, there was strong desire to continue to reflect upon this new clarity to understand the direction they could now follow; clients were left feeling motivated and empowered with a changed mind-set. The clients left session with an increased respect for coaching.

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Coaching High Achievers	Jones, G & Spooner, K. (2006)	Consulting Psychology Journal: Practice and Research	14 coachees / 7 coaches	phenmenological	high achievers' attributes (e.g. self-focused, goal-driven, confident, totally committed, demanding, contrinully striving for improvement, sponge for information); client needs coach who is confident yet lacks ego
The application of the 3+1Cs relationship model in executive coaching	Jowett, S., Kanakoglou, K., Passmore, J. (2012)	Consulting Psychology Journal: Practice and Research	5 coach-coachee dyads, 10 participants	hermeneutic / phenomenological	importance of trust (mutual liking, respect, intimacy, bonding) for commitment in terms of developing a partnership that is thought to be close and lasting (if I see a future or benefit I will be willing to invest myself), willingness and motivation and complementary traits; 3+1Cs (closeness, commitment, complementarity and co-orientation) lead to behavior change
A model of executive coaching: key factors in coaching success	Kappenberg, E.S. (2008)	Dissertation	2 phases: 8 coaches & 36 executive coaches	grounded theory	client engagement (defined as the client's intrinsic motivation and willingness to be effortful through coaching), organizational support (described the need for the client's environment to accept and support coaching efforts) and coaching practices (described skills fundamental to the coach (e.g., goal-setting, providing feedback, follow-up) were found to be important; trust, anticipated to be a strong predictor of coaching success, was found to be a significant but weaker predictor of outcome
Grappling with the gods: reflection for coaches of the narcissistic leader	Kearney, K.S. (2010)	International Journal of Evidence Based Coaching and Mentoring	1 executive	hermeneutic phenomenological	narcissism coaches may face; voluntary assignment with client who deemed himself 'uncoachable', he gave in as pressures rose; delayed finalizing specific plans for coaching and was adamant that it not occur near organization's site; outwardly willing to participate, he did not appear engaged, certainly not enthused; discomfort seemed to be usual and was expected to grow with built of trust; in preparation process detached himself from process; stopped being available for coaching after having agreed goals; failed engagement; intense individual focus is an inherent part of process; may be viewed by client as stressful; a real threat to sense of well being and is associated with increased stress; lack of attachment to values; poor follow-through
A phenomenological study exploring executive coaching: Understanding perceptions of self-awareness and leadership behavior changes	Kress, D,M. (2009)	Dissertation	25 executives in a pilot study	hermeneutic phenomenological	coaching experiences change perceived levels of self-awareness contributing to leadership behavior change; leaders who participated in research study were asked to explore how they perceived self-awareness and its meaning for changed leadership behaviors
Exploring client's readiness for coaching	Kretzschmar, I. (2010)	International Journal of Evidence Based Coaching and Mentoring	18 semi-structured face-to-face interviews 9 email interviews involving coaches, coachees & enquirers about coaching.	grounded theory	readiness for coaching: situational and institutional variables & dispositional client variables; Culture and Class, Knowledge about Coaching, Access to Coaching, Psychological Interpretations, Feeling Safe and Commitment to Change; unreliability of some of the learners, their resistance to change and lack of development; suitability for coaching (coachability)
Transformative effectis of coaching on executives' professional agenda	Laske, O.E.(1999a), (1999b)	Dissertation & Consulting Psychology Journal	6 executives	phenmenological	lifespan maturity as a predictor of transformational change; developmental readinesss of coachee; dev. potential (e.g. regression under stress or toxic organizational climate), systemic grasp (complexity awareness), critical vs. constructive thinking) / clients' structure of interpretation (how world shows up for them, capability ceiling): develop self-generation (ability to renew oneself by developing new self image, finding new inner resources, letting go of assumptions and values no longer appropriate or useful, & being aware of one's developmental potential & risk); self-correction (ability to conceptualize and scan environment in systemic manner, flexibly alter courses of action, analyze habits and limits, & become continuous learner)

Table 2.2. Summary table of primary qualitative studies reviewed in the qualitatitive meta-synthesis

Type of study - Case Study - Title	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
The 'Aha' Moment in Co-Active Coaching and its Effects on Belief and Behavioural Changes	Longhurst, L. (2006)	International Journal of Evidence Based Coaching and Mentoring	20 coaches / 12 co-active coaches & 30 past coachees	phenomenological / grounded theory	aha moment facilitated by metaphor through the bodymind (energies trapped in the meridian system), & subconscious emotional ease or discomfort & capacity for non-judgemental self-examination & body experiences (felt in the heart, chest, stomach, gut, solar plexus, or as a sudden rush of energy throughout the body) & mind experiences (change in perspectives, beliefs, self-talk, decision-making powers, clarity of ideas) & felt experiences (relief, peace, calm, and often excitement and an 'inner knowing' or intuition) & soul experiences (inner knowing: moving from dependence to autonomy, passivity to activity, subjectivity to objectivity and selfishness to altruism) & spiritual experiences (inner knowing) & non-dual experiences
Stepping off the treadmill: A study of coaching on the RCN Clinical Leadership Programme	MacKenzie, H. (2007)	International Journal of Evidence Based Coaching and Mentoring	8 leaders	phenomenological	sense of urgency and immediacy impacting on the implementation of insights gained through coaching, anxieties at outset of coaching relationshhip, carrying unresolved emotions, confidence in intentions of the coach; influenced by clients' anxieties (daunted, uncertain) & being out of the comfort zone & beliefs and perceptions & contextual understanding & attitude clients have towards themselves (confidence) & clients' perception of their professional culture; influenced by willingness to work with courage and manage own fears & openness to challenge & being wholly present & respect for coach & feeling safe (safe environment) & confidence in intentions and capabilities of coach & capacity to realise enabling character of coaching
Coaching the narcissist: how difficult can it be?	Mansi, A. (2009)	The Coaching Psychologiy	1 case	phenmenological	dark side of personality, e.g, narcisism in leaders and core issues that coaches may face; narcissist resistant to coaching, particularly towards those aspects which challenge the person's self view
The critical factors of coaching practice leading to successful coaching outcomes	Marshall, M.K. (2007)	Dissertation	66 participants / 19 coaches interviewed	phenmenological	personal philosophies influencing breakdown or success, therapeutic issues, coach/client mismatch, lack of willingness or ability to take action and make commitments, unrealistic expectations, negative mindsets that could not be shifted, factors that lead to success are client connection, client accountability, openness and motivation
The voice of leadership: Critical success factors of executive women	Martell, N.G. (2005)	Dissertation	large scale study	grounded theory	critical success factors (passion, support, balance and caring) as factors to aid the identification and retention of women
Executive coaching and self- efficacy: A study of goal-setting and leadership capacity	Minski C.A. (2014)	Dissertation	20 executive coaches	phenmenological	coaches mention those high in self-efficacy are open to feedback; coaches see high self-efficacy as beneficial to achieving significant goals in workplace; coaches view self-efficacy as important to goal achievement; coaches note that leaders need a safe place to admit their level of efficacy; as coach is building a relationship, understanding the client's-efficacy was important; coaches describe self-efficacy as confidence
Presence in executive coaching conversations: The C2 model	Noon, R. (2018)	International Journal of Evidence Based Coaching and Mentoring	focus groups / 3 coaches & 3 coachees	phenomenological	each person's presence affecting the other; subjective, objective and relational experiences are part of interdependent, holistic whole; conditions that contributed to deepening presence were reported to include client and coach attitudes of openness, compassion, respect and empathy; a requirement for practice; the value of experience; and a conducive physical environment (which may include face-to-face or non-physical contexts); also involved intentional decisions and actions during coaching conversation (improving posture, focussing on breath, feeling grounded, making eye contact and allowing time at beginning of session for both to become present); conditions link topresence as a way of being that can be practiced, cultivated and learnt
Exploring key aspects in the formation of coaching relationships: initial indicators from the perspective of the coachee and coach	O'Broin,A. Palmer , S. (2010c)	Coaching: An International Journal of Theory, Research and Practice	6 coaches, 6 coachees	phenmenological	trust as key aspect of bonding and engagement & coach's attributes as well as coach's self-awareness and awareness of coachee
A grounded theory study of the coachee experience: The implications for training and practice in coaching psychology	Passmore, J. (2010)	International Coaching Psychology Review	6 coachees / directors / 3 male & 3 female	grounded theory	results suggest that coachees seek not only particular behaviours but also certain personal attributes in coach. Key behaviours identified were common sense confidentiality, being collaborative, setting take-away tasks, balancing challenge and support, stimulating problem- solving, effective communication, staying focused, containing emotions, helping develop alternative perspectives, use of a variety of focusing tools and techniques and use of self

Table 2.2. Summary table of primary qualitative studies reviewed in the qualitatitive meta-synthesis

Type of study - Case Study - Title	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
Transfer of training: Reported perceptions of participants in a coaching study in six organizations	Sawczuk, M.P. (199(	Dissertation	6 organizations	phenmenological	participants' perception of the coaching model influence their behaviour
Understanding the importance of gender and leader identity formation in executive coaching for senior women	Skinner, S. (2014)	Coaching: An International Journal of Theory, Research and Practice	11 coachees / female	grounded theory	several enabling factors that contributed to leader identity formation and helped to mitigate impact of male norms of leadership evident at senior levels. These included coach as role model, managing motivation at senior levels and leading with authenticity; coaching process provided contextual support for identity formation, via engagement in regular dialogue and reflection; as a result senior women became more able to authentically identify themselves as leaders, developing a deep sense of self, being clear about personal values and beliefs, and finding ways to sustain their leadership roles in the long term
Investigating the role of the active ingredients in executive coaching	Smith, I.M. & Brummel, B.J. (2013)	An International Journal of Theory, Research and Practice	30 executives	phenmenological	active ingredients: executive involvement, perceptions of developability leads to higher competency change
The nature of executive coaching: An exploration of the executive's experience	Sztucinksi, K. (2002)	Dissertation	7 executives (5 males, 2 females)	phenmenological	Path to Achievement: openness to coaching due to motivation to get promoted, need to figure out what was in the way of performance: fear of failure, authority of boss as role model); Ownership: choice, sense of control of content and rules governing sessions, exclusivity, willingness and readiness to confront self and reflect), Array of Emotion: trust, relaxation, ability to stay with discomfort, turbulence, vulnerability; Bond with Coach: trust in coach, feeling comfortable disagreeing with coach, desire to please coach, personal chemistry, all: high regard forand strong bond with coach; Ouccome: Goal Accomplishment, (2) Enhanced Self-Esteem, (3) Change in Focus, (4) Insight/Self Awareness, (5) On-Going Growth and (6) Better Executive.
Coaching as second-order observations: Learning from site managers in the construction industry	Styhre, A. (2008)	Leadership & Organization Development Journal	6 managers	phenmenological	social context impacts learning; capactiy to reflect and self-observe impacts on behaviour; that is the ability for both to achieve a deep level of psychological reflection and understanding lead to transfer of learning and behavioural change
“If I learn do we learn?”: The link between executive coaching and organizational learning.	Swart, J., & Harcup, J. (2013)	Management Learning	23 stakeholders: coachees, their team members (as observers of the coachees), their coaches, and representatives of management	phenmenological	translation from individual learning into collective learning, i.e. enacting behaviours, enacting a coaching approach and embedding collective learning processes; data gathered in two law firms wherein learning was the result of executive coaching interventions to pinpoint the mechanisms by which individual and collective learning is interconnected, thereby heeding a call for a more detailed understanding of the mechanisms of learning presented
Designing a coaching intervention to support leaders promoted into senior positions	Terblanche, N., Albertyn, R. M., & Coller-Peter, S. (2017)	SA Journal of Human Resource Management	16 leaders	grounded theory	coach-coachee matching impacts opens up reflection; reflection used in various ways including obtaining clarity of thinking, identifying alternative solutions, feeling unjudged, and creating awareness of positive thoughts; distinction between assisted reflection, led by the coach and self-reflection, performed by coachee outside of coaching sessions; reflection to close the active experimentation learning loop; organisational conditions and circumstances impact clients' capacity to learn and implement learning effectively
Exploring what clients find helpful in a brief resilience coaching program: A qualitative study	Timson, S. (2015)	The Coaching Psychologist	6 coachees	phenmenological	pressured working environment; time and space; and coaches; fact of moving forward impact on resilience in coaching; Pparticipants highlighted pressured environment under which they were working and value of tools and techniques that they had learnt which helped them move forward; the value of time and space that coaching sessions gave them, and how important independent supportive relationship with coaches had been.
Strengthening coaching: An exploration of the mindset of executive coaches using strengths-based coaching	Toogood, K. (2012).	International Journal of Evidence Based Coaching and Mentoring	6 coachees	phenomenological	conscious awareness of coaches leads to faster growth; coach's authenticity and alignment, identity and sense of values and self and 'it makes intuitive sense' lead to self-actualising; flexibility and capacity of use of self build confidence, self-belief and identity; these elements all seem to be important for both coach and client

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Type of study - Case Study - Title	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
Executive coaching as a leadership development strategy	Turner, E. (2003)	Dissertation	9 executive coaches, 9 coachees, and 1 former coachee who had become an executive coach	grounded theory	trust, reflection, willingness, motivation, action / willing based on motivation, trust, action, and reflection; concepts: (a) coaching relationship begins with competent coach and agreeable participant; (b) coaching creates a synergy of learning benefiting the organization, followers, and participating leaders in personal and professional roles; (c) coaching goals are inclusive of interpersonal relationships and influence upon leadership, genuineness, and improved self-awareness; executives found the participation in coaching beneficial: (a) continuous individualized attention; (b) expanding their thinking; (c) improved self-awareness by way of identification of blind spots; (d) taking responsibility for personal development;
Coaches' views on the relevance of unconscious dynamics to executive coaching	Turner , E. (2010)	International Journal of Theory, Research and Practice	15 interviews	phenmenological	perceived unconscious processes: counter-transference
Coachable moments: Identifying factors that influence managers to take advantage of coachable moments in day-to-day management	Turner, C., & McCarthy, G. (2015)	International Journal of Evidence Based Coaching and Mentoring	10 managers	phenmenological	awareness of risk if employee did not welcome coaching, or coach/manager had over-estimated relationship and level of trust / coachability of internal client affects relationship: whether a coachee was 'too junior', aggressive or difficult to relate to, inherent makeup of employee was such that they did not want to learn, coachees wanted feedback; underpinning this was mutual trust and respect; key factors were time to coach, level of ambiguity around learning, level of risk to them and activity undertaken; how competent coach felt weighed up; the view that informality gave rise to coachable moments: "it needs to be an intimate moment"/"the office reminds you of status", and "ambience is important – they don't see you as their boss".
Developing Leader Consciousness through Executive Coaching	Turner, J. & Mavin, S. (2015)	Towards Evidence Based HRD Practice: Bridging the Gap	1 senior leader (plus, in 2014 interviews with 15 leaders)	phenomenological / hermeneutic	self-awareness / consciousness
Why coaching?	Wales, S. (2003)	Journal of Change Management	group of managers	phenmenological	self-awareness and confidence as internal benefits of coaching and external benefits consisting of leadership and management, assertiveness, understanding difference, stress management, and work/life balance; effective communication skills bridged the gap between internal growth and achievement of external benefits and that coaching developed leadership and behavioral competencies that leaders used to present ideas and vision to followers

Article -Descriptive Statistics	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
Shame in the coaching relationship: reflections on organisational vulnerability	Cavicchia, S. (2010)	Journal of Management Development	3 cases	narrative / grounded theory	inhibiting effect of shame on spontaneity and improvisation, impact of shame on coach-coachee relationship and manifestations of shame in the coach-coachee relationship , shame as unproductive pattern of relating
Narratives of illness and emotional distress in executive coaching: An initial analysis into their forms and functions	Graf, E. (2012)	Poznán Studies in Contemporary Linguistics	1 case	phenomenological	clients' emotional experiences take center stage, yet not for sole purpose of clients' self-reflexivity and self-fulfillment, but for organizational purposes such as evoking peak-performance; it is claimed that clients' narratives of emotional distress and their processing, not only fulfill an emancipatory function that allow for verbalization of less-dominant discourses and staging of less-dominant identities, but simultaneously serve as situated practices of functionalizing emotions for the organization
A new frontier of research and practice: Observation of coaching behavior	Greif, S. (2010)	The Coaching Psychologist	1 case	phenmenological	The last time I thought about myself and my goals, I developed a plan for how to accomplish my goals.': facilitation of such reflections in coaching process by coach contribute to positive coaching outcomes; following two differentiations and assumptions have to be taken into account: reflection is necessary and constructive only if a task cannot be performed efficiently using routine behaviour, and if it focuses positively on specific problems that have to be solved; observed behaviour of coaches: (1) appreciation and emotional support of the client; (2) result-oriented problem reflection; (3) result-oriented self-reflection; (4) reflection and calibration of affects; (5) clarification of goals; (6) resource activation; and (7) support of transfer into practice

Table 2.2. Summary table of primary qualitative studies reviewed in the qualitatitive meta-synthesis

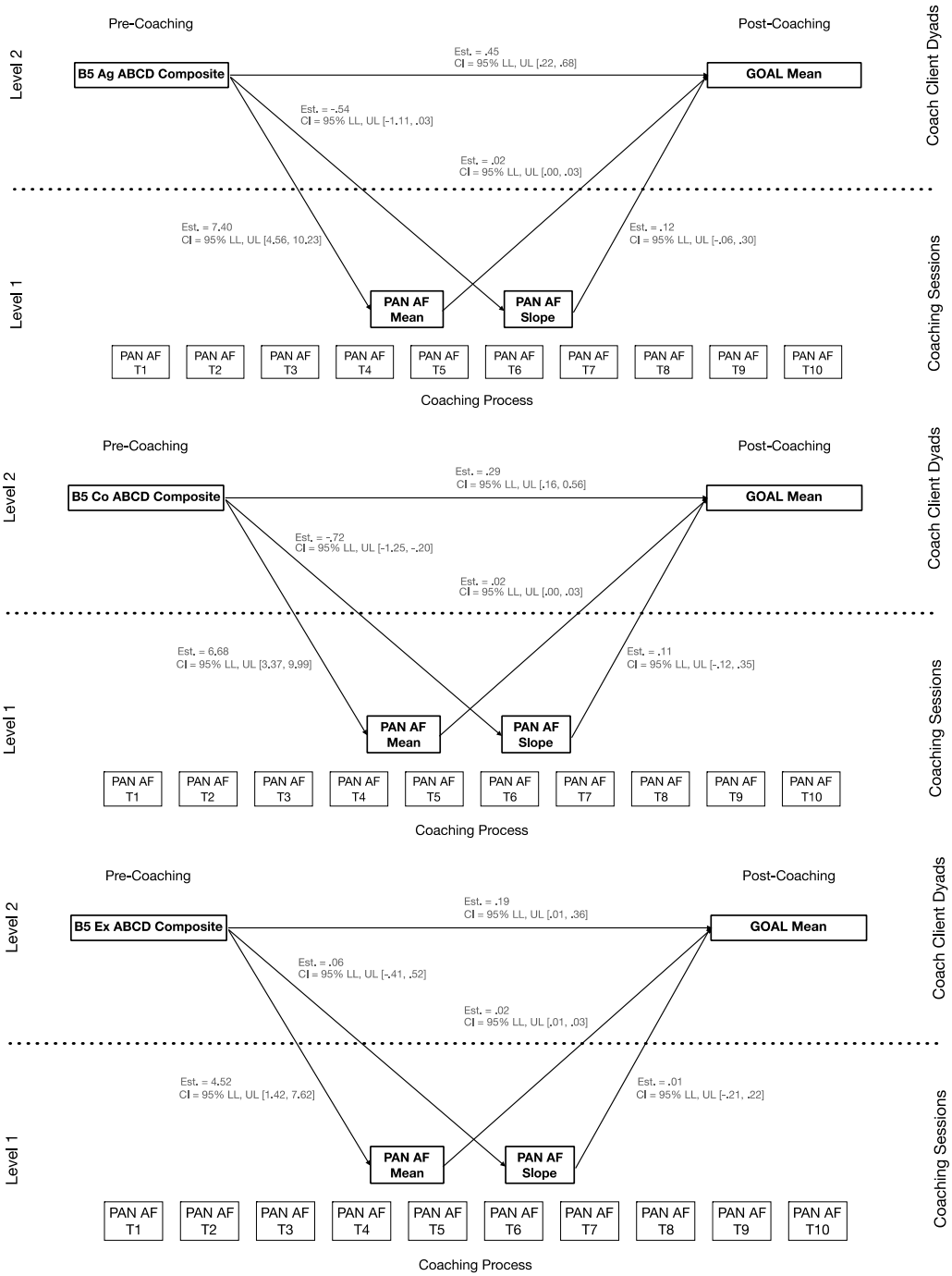
Type of study - Case Study - Title	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
A multiple perspective analysis of a coaching session	Myers, A. C. (2014)	Disseration	6 cases	phenmenological	Facilitating conditions (readiness, credibility of coach, time and space to reflect) lead to satisfaction of interpersonal needs (meaning making, empathy, attention given, sense of control,, which again leads to positive outcomes and engagement (confidence, clarity, commitment): clients were "ready" to address challenges; physical presence of coach was crucial to meaning making; to be encouraged to reflect, challenged and the how lead clients to feel in control. This was expressed in terms of clients' feeling they could direct course of session and that coach was working to their agenda; sense of being listened to empathically/authentically helped feel at ease; sense of being in control seemed important in a psychological sense
Article - Exploratory Study	**Author**	**Journal**	**Number of participants**	**Research paradigm**	**Verbatim of client factors and contextual factors**
The effectiveness of business coaching: an empirical analysis of the factors that contribute to successful outcomes	Blackman, A. (2006)	Dissertation	18 Education and 8 Tourism Sector professionals	phenmenological	coachee factors such as commitment and self-efficacy or readiness to put in effort and belief that it is going to be successful (trust), open to feedback and willingness to change, preoccupations with other matters is a barrier, locus of ontrol, intrinsic motivation from coachee perspective and career experience, taking an active involvement and having desire to achieve goals set for the coaching process to be effective; concern of what others think and whether there will be a reward or punishment related to a behaviour or attitude change as reflected in the Elaboration Likelihood Model and Theory of Planned Behavior; high level of initiative leads to achievement of the goals; trust in the coach
Factors that contribute to the effectiveness of business coaching: The coachees perspective	Blackman, A. (2006)	Business Review	114 coachees	phenomenolodigal	factors within coach, coachee, coaching process, and organization that seem important to coachees for successful coaching; coachees' motivation and readiness to learn; waning support from third parties did not have a significant influence on coachees' reported effectiveness but the experienced barriers did. "Unclear development goals and lack of agreement with my coach on my goals" was the single biggest barrier identified by this sample of coachees
How executive coaching can change leader behavior and improve meeting effectiveness: An exploratory study.	Perkins, R.D. (2009)	Consulting Psychology Journal: Practice and Research	21 (20 male & 1 femaile leader)	grounded theory	achievement-oriented and competitive leaders (personal style) ready and eager to change meeting leader behaviour: the higher the IQ the less likely that leaders change behaviour in direction of seeking information; age and mental abilities do not seem to matter
Keeping our heads above water: Applying Kegan's orders of consciousness theory in coaching	Pinkavova, E. (2010)	Internaional Journal of Evidence Based Coaching and Mentoring	4 cases	phenomenolodigal / heuristics	sense of self (understanding our world can be instrumental in creating a strong, independent sense of self) as distinguished from Myers Briggs personality types (which are preferences rather than capacities or competencies); self-concept / client's interpretation and reactions to experiences / cognitive capacity / change readiness or openness
Article - Interaction Analysis	**Author**	**Journal**	**Number of participants**	**Research paradigm**	**Verbatim of client factors and contextual factors**
The Working Alliance in Coaching - Why Behavior Is the Key to Success	Gessnitzer, S. & Kauffeld, S- (2015)	The Journal of Applied Behavioural Sciences	31 cases	phenmenological	focus on indicators of working relationship (client's initiative / role of active client in the coaching process
"I am going to succeed": The power of self-efficient language in coaching and how coaches can use it	Gessnitzer, S., Schulte, E.-M., & Kauffeld, S. (2016)	Consulting Psychology Journal: Practice and Research	first, third, and fifth session of 31 coaching dyads	phenmenological	self-efficient coachee statements (i.e., self-beliefs about success) increased with the amount of coaching and predicted goal-attainment; open questions and offering support by coaches led to more self-efficient coachee statements (as did offering solutions, a very directive intervention, but only in the very first session) and that support of coaches after a self-efficient statement could significantly lead to more self-efficient coachee statements immediately after
Coaching the mentor: Facilitating reflection and change	Gordon, S. P. & Brobeck, S.R. (2010)	Mentoring & Tutoring Partnership in Learning	1 coach-mentor pair	phenmenological	cognitive dissonance and its impact on mentoring;

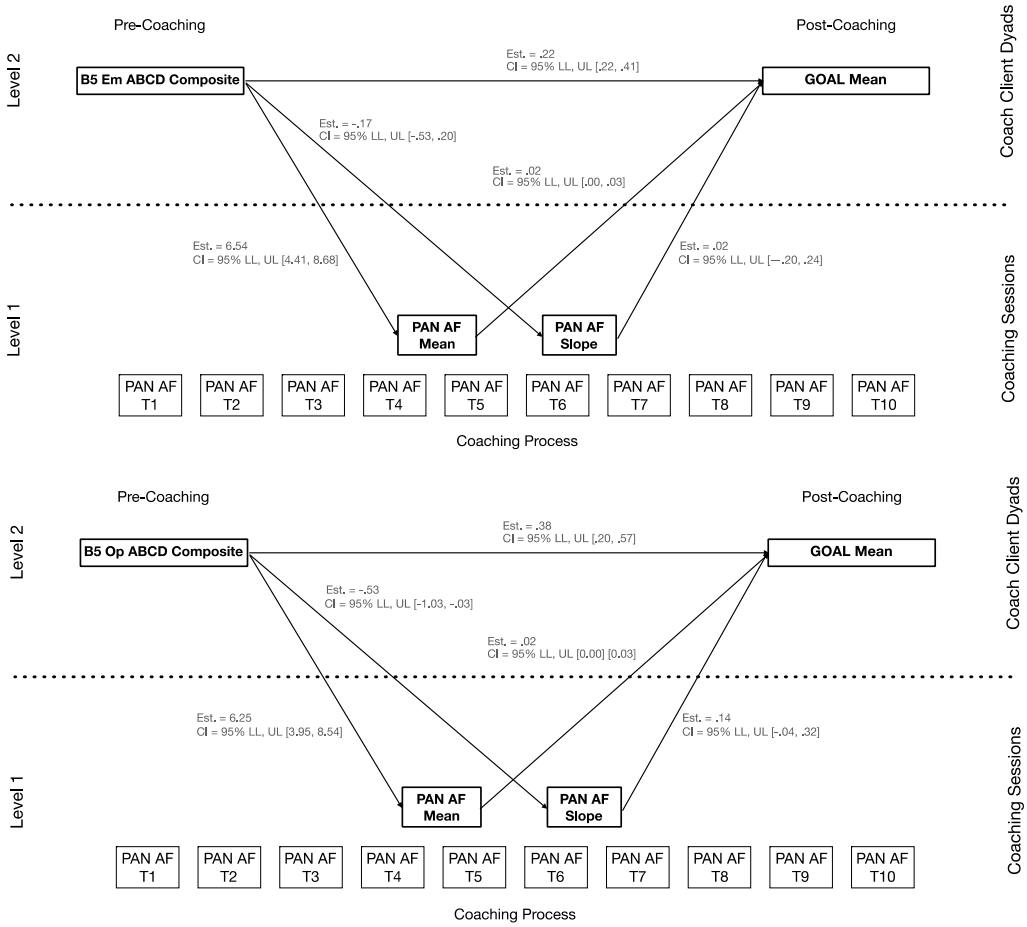
Table 2.2. Summary table of primary qualitative studies reviewed in the qualitatitive meta-synthesis

Type of study - Case Study - Title	Author	Journal	Number of participants	Research paradigm	Verbatim of client factors and contextual factors
Take care what you bring with you: How coaches' mood and interpersonal behavior affect coaching success	Ianiro, P. M., & Kauffeld, S. (2014)	Consulting Psychology Journal: Practice and Research	48 coach-coachee dyads	phenmenological	coach's verbal and nonverbal interpersonal behavior affects client's behavior and perceptions of working alliance; coach's mood before coaching affects their in-session interpersonal behavior and client's ratings on working alliance; positive relations between dominant-friendly interpersonal behavior of coaches and clients; coach's dominant-friendly behavior, in turn, is positively related to client's ratings of working alliance afterfirst session and at end of 5th session; coach's pleasant mood predicted amount of his or her in-session dominant-friendly interpersonal behavior and was positively related to client's working alliance ratings; coaches' awareness of own affective states and interpersonal behaviors help in establishing successful WA
Coaches and Clients in Action: A Sequential Analysis of Interpersonal Coach and Client Behavior	Ianiro, P.M., Lehmann-Willenbrock, N. & Kauffeld, S. (2014)	Journal of Business and Psychology	30 coach-coachee dyads	phenmenological	Clients' dominance linked to overall goal attainment: dominance interaction patterns are context-and relation-specific, offering an explanation for contradicting empirical studies on interpersonal dominance. For coaches, the study implies that high awareness for interpersonal signals can help establish a positive atmosphere and activate clients' dominance
Why interpersonal dominance and affiliation matter: an interaction analysis of the coach-client relationship	Ianiro, P.M., Schermuly, C.C., Kauffeld, S. (2013)	Coaching: An International Journal of Theory, Research and Practice	33 coach-coachee dyads	phenmenological	process variables critical to success: affliation and dominance, complementarity and simliarty, if clients and coaches are similar in dominance patterns clients rate relationship as more agreeable
Conformity to Masculine Norms and Preferences for Therapy or Executive Coaching	McKelley, R.A. Rochlen, A.B. (2010)	Psychology of Men & Masculinity	209 working adult men	phenmenological	conformity to norms and help-seeking attitudes; men had similar and relatively positive help-seeking attitudes for executive coaching; however, men with higher conformity to masculine norms had higher stigma toward seeking help and viewed traditional therapy as less favorable; masculine norms, attitudes and preferences as predictors of seeking help
Executive coaching in diversity from the systems psychodynamic perspective	Motsoaledi, L., & Cilliers, F. (2012)	SA Journal of Industrial Psychology	6 executives	phenmenological	conscious and unconscious diversity dynamics emerged in six themes: gender and race; ethnicity and culture; power and authority; disability, language and age; and de-authorisation of diversity work by executives were less significant; coaching sessions served as a space for reflection to become learners about psychodynamic primary tasks; as coach contained executives' anxieties and defences clients could explore previously unaware possibilities with eagerness, curiosity and intensity. Finally, executives showed 'executive wisdom'; leads to taking up the leadership role openly to experience and explore own, team and organisational behaviours creatively to achieve cognitive understanding, a strong sense of self and a systemic awareness of process and dynamics.

Notes: The verbatim of client factors and contextual factors is a summary of quotes relevant for answering the research questions. As such, it accounts for the limitation of space in his table.

Figure 3.7. Iterated 2-1-2 mediation model: GOAL Mean per B5 Trait / ABCD Composite





Note. The iterated 2-1-2 path model indicating mean model results as regression coefficients (Est.) and confidence intervals (CI) for each personality trait / ABCD composite: B5 Ag (Big Five Agreeableness), B5 Co (Big Five Conscientiousness), B5 Em (Big Five Emotional Stability), B5 Ex (Big Five Extraversion), B5 Op (Big Five Openness) with the balanced representation of the Affect (A), Behavior (B), Cognition (C), and Desire (D) components. Estimates indicate the regressed coefficient of the relationship between two variables based on the observed data, respectively. Values in square brackets indicate the 95% confidence interval for each correlation The confidence interval is a plausible range of population correlations that could have caused the sample correlations (Cumming, 2014) and the affect correlations that could have mediated the goal correlations. LL and UL indicate the lower and upper limits of a confidence interval, respectively. The associated p-values for all multilevel paths models computed in this study are shown in Table 3a, 3b and Table 4a and 4b, respectively.

Table 3.4a.

Indirect Effects and p-Values from Multilevel Path Models Including Mean Affect Balance as a Mediator - Big Five on GOAL

Variable	GOAL composite		Perceived competence		Goal commitment		Goal self-concordance		Goal stability	
	Est.	*p*	*Est.*	*p*	*Est.*	*p*	*Est.*	*p*	*Est.*	*p*
Agreeableness ABCD Composite	0.11	0.02	0.28	0.00	0.17	0.02	0.06	0.39	-0.05	0.60
Agreeableness Affect	0.08	0.04	0.16	0.01	0.11	0.03	0.07	0.13	-0.02	0.72
Agreeableness Behavior	0.08	0.02	0.19	0.00	0.11	0.02	0.06	0.21	-0.03	0.61
Agreeableness Cognition	0.09	0.03	0.19	0.01	0.13	0.03	0.07	0.18	-0.02	0.76
Agreeableness Desire	0.09	0.02	0.21	0.00	0.13	0.02	0.06	0.26	-0.04	0.64
Conscientiousness ABCD Composite	0.13	0.01	0.27	0.00	0.19	0.01	0.13	0.07	-0.07	0.45
Conscientiousness Affect	0.00	0.94	-0.01	0.92	0.00	0.94	0.00	0.94	0.00	0.94
Conscientiousness Behavior	0.07	0.01	0.14	0.00	0.10	0.01	0.07	0.07	-0.02	0.57
Conscientiousness Cognition	0.12	0.04	0.28	0.00	0.18	0.01	0.08	0.36	-0.07	0.55
Conscientiousness Desire	0.06	0.05	0.12	0.03	0.08	0.04	0.06	0.11	-0.02	0.64
Emotional Stability ABCD Composite	0.11	0.03	0.24	0.00	0.17	0.01	0.09	0.21	-0.05	0.57
Emotional Stability Affect	0.08	0.02	0.15	0.00	0.12	0.01	0.08	0.07	-0.02	0.74
Emotional Stability Behavior	0.05	0.04	0.11	0.02	0.07	0.05	0.05	0.12	-0.02	0.57
Emotional Stability Cognition	0.08	0.02	0.15	0.00	0.12	0.01	0.07	0.18	-0.03	0.67
Emotional Stability Desire	0.07	0.01	0.13	0.00	0.09	0.01	0.06	0.07	-0.01	0.84
Extraversion ABCD Composite	0.09	0.06	0.19	0.03	0.14	0.05	0.08	0.17	-0.02	0.71
Extraversion Affect	0.08	0.04	0.15	0.02	0.11	0.04	0.05	0.20	-0.02	0.77
Extraversion Behavior	0.01	0.65	0.02	0.62	0.02	0.64	0.01	0.66	0.00	0.83
Extraversion Cognition	0.08	0.05	0.15	0.02	0.11	0.05	0.07	0.14	-0.02	0.74
Extraversion Desire	0.07	0.05	0.14	0.02	0.11	0.04	0.07	0.13	-0.03	0.54
Openness ABCD Composite	0.09	0.03	0.23	0.00	0.14	0.02	0.06	0.37	-0.06	0.50
Openness Affect	0.09	0.02	0.20	0.00	0.14	0.01	0.05	0.26	-0.04	0.53
Openness Behavior	0.10	0.02	0.20	0.01	0.13	0.02	0.08	0.11	-0.02	0.72
Openness Cognition	0.06	0.03	0.13	0.01	0.09	0.02	0.05	0.16	-0.03	0.57
Openness Desire	0.07	0.02	0.17	0.00	0.11	0.01	0.05	0.24	-0.03	0.59

Note. 2-1-2 mediation model output estimate (Ext.) and two-tailed p-value (p) for Goal Attainment (GOAL) on Big Five trait facets and domains. Slope referes to grow slope of Affect Balance per session. Indirect effects between slope of mediator on Big Five trait and slope of GOAL on slope of mediator (indb) and indirect effects between slope of Affect Balance on Big Five trait and slope of GOAL on Affect Balance (indd).

Table 3.4b.

Indirect Effects and p-Values from Multilevel Path Models Including Mean Affect Balance as a Mediator - Maples on GOAL

Variable	GOAL composite		Perceived competence		Goal commitment		Goal self-concordance		Goal stability	
	Est.	*p*	*Est.*	*p*	*Est.*	*p*	*Est.*	*p*	*Est.*	*p*
Agreeableness Composite	0.13	0.02	0.28	0.00	0.18	0.03	0.07	0.33	-0.03	0.78
Agreeableness Facet 1	0.04	0.15	0.08	0.13	0.06	0.16	0.04	0.22	-0.01	0.79
Agreeableness Facet 2	0.06	0.05	0.12	0.03	0.08	0.07	0.05	0.16	0.00	0.92
Agreeableness Facet 3	0.07	0.02	0.16	0.00	0.11	0.02	0.05	0.31	-0.02	0.69
Agreeableness Facet 4	0.08	0.02	0.16	0.00	0.11	0.03	0.06	0.21	-0.01	0.88
Agreeableness Facet 5	-0.03	0.16	-0.06	0.17	-0.04	0.16	-0.03	0.19	0.01	0.79
Agreeableness Facet 6	0.07	0.04	0.15	0.02	0.10	0.03	0.06	0.14	-0.02	0.61
Conscientiousness Composite	0.07	0.27	0.24	0.01	0.15	0.13	0.03	0.78	-0.12	0.35
Conscientiousness Facet 1	0.07	0.10	0.17	0.00	0.11	0.06	0.04	0.48	-0.06	0.51
Conscientiousness Facet 2	0.07	0.01	0.15	0.00	0.11	0.01	0.06	0.10	-0.04	0.47
Conscientiousness Facet 3	0.11	0.02	0.21	0.00	0.16	0.01	0.06	0.37	000	0.97
Conscientiousness Facet 4	0.07	0.05	0.19	0.00	0.10	0.05	0.07	0.22	-0.06	0.39
Conscientiousness Facet 5	0.07	0.03	0.14	0.00	0.10	0.03	0.23	0.00	-0.02	0.71
Conscientiousness Facet 6	0.07	0.01	0.14	0.00	0.10	0.01	0.07	0.06	-0.02	0.61
Neuroticism Composite	-0.11	0.03	-0.22	0.00	-0.17	0.01	-0.09	0.21	0.07	0.47
Neuorticism Facet 1	-0.05	0.01	-0.09	0.00	-0.07	0.01	-0.05	0.04	0.02	0.65
Neuroticism Facet 2	-0.02	0.34	-0.03	0.35	-0.03	0.35	-0.02	0.38	0.00	0.76
Neuorticism Facet 3	-0.08	0.02	-0.15	0.00	-0.11	0.01	-0.05	0.27	0.01	0.87
Neuroticism Facet 4	-0.10	0.01	-0.19	0.00	-0.14	0.01	-0.08	0.12	0.02	0.79
Neuroticism Facet 5	-0.03	0.15	-0.05	0.14	-0.04	0.18	-0.03	0.21	0.01	0.72
Neuroticism Facet 6	-0.07	0.04	-0.14	0.00	-0.12	0.01	-0.08	0.11	0.06	0.36
Extraversion Composite	0.10	0.03	0.21	0.00	0.16	0.02	0.07	0.25	-0.06	0.44
Extraversion Facet 1	0.07	0.02	0.14	0.01	0.11	0.02	0.05	0.17	-0.02	0.72
Extraversion Facet 2	0.02	0.37	0.03	0.35	0.02	0.37	0.01	0.41	0.00	0.76
Extraversion Facet 3	0.07	0.04	0.13	0.01	0.11	0.03	0.06	0.14	-0.03	0.52
Extraversion Facet 4	0.07	0.03	0.13	0.01	0.10	0.02	0.06	0.12	-0.02	0.71
Extraversion Facet 5	0.06	0.04	0.12	0.02	0.09	0.03	0.04	0.18	-0.03	0.51
Extraversion Facet 6	0.09	0.02	0.21	0.00	0.14	0.01	0.08	0.15	-0.07	0.34
Openness Composite	0.06	0.05	0.11	0.02	0.08	0.05	0.05	0.14	-0.01	0.80
Openness Facet 1	0.04	0.10	0.07	0.09	0.05	0.10	0.03	0.16	-0.01	0.72
Openness Facet 2	0.06	0.05	0.11	0.02	0.08	0.05	0.05	0.14	-0.01	0.80
Openness Facet 3	0.01	0.66	0.02	0.63	0.02	0.66	0.01	0.66	0.00	0.84
Openness Facet 4	0.05	0.07	0.10	0.05	0.08	0.07	0.04	0.15	-0.01	0.87
Openness Facet 5	0.05	0.08	0.09	0.07	0.06	0.08	0.04	0.15	0.00	0.88
Openness Facet 6	0.01	0.68	0.02	0.67	0.01	0.68	0.01	0.67	0.00	0.84

Note. 2-1-2 mediation model output estimate (Ext.) and two-tailed p-value (p) for Goal Attainment (GOAL) on Big Five trait facets and domains. Slope referes to grow slope of Affect Balance per session. Indirect effects between slope of mediator on Big Five trait and slope of GOAL on slope of mediator (indb) and indirect effects between slope of Affect Balance on Big Five trait and slope of GOAL on Affect Balance (indd).

Table 5.5.

Cluster Dyads with Linear Curve Fit

	Model Summary				ANOVA						Coefficients				
											Unstandardized coefficients		Standardized coefficients		
	R Square	Adj R Square	Std. Error of Est.		Sum of squares	df	Mean Square	F	Sig. / p-value		unstand. B	unstand. CoStE	Beta	t	Sig.
SYN 102	0.193	0.037	-0.083	Regression	0.014	1	0.014	0.311	0.592	Session	-0.013	0.023	-0.193	-0.558	0.592
				Residual	0.349	8	0.044			(Constant)	1.088	0.143		7.621	0.000
SYN 301	0.870	0.854	0.086	Regression	0.401	1	0.401	53.78	0.000	Session	-0.070	0.010	-0.933	-7.333	0.000
				Residual	0.060	8	0.007			(Constant)	1.327	0.059		22.489	0.000
SYN 302	0.726	0.692	0.177	Regression	0.661	1	0.661	21.23	0.002	Session	-0.090	0.019	-0.852	-4.607	0.002
				Residual	0.249	8	0.031			(Constant)	1.485	0.121		12.315	0.000
SYN 401	0.196	0.062	0.254	Regression	0.095	1	0.095	1.462	0.272	Session	0.047	0.039	0.443	1.209	0.272
				Residual	0.388	6	0.065			(Constant)	1.130	0.198		5.706	0.001
SYN 402	0.187	0.051	0.212	Regression	0.062	1	0.062	1.38	0.285	Session	0.038	0.033	0.432	1.174	0.285
				Residual	0.270	6	0.045			(Constant)	0.938	0.165		5.675	0.001
SYN 601	0.005	-0.119	0.150	Regression	0.001	1	0.001	0.042	0.843	Session	-0.003	0.017	-0.072	-0.205	0.843
				Residual	0.181	8	0.023			(Constant)	1.600	0.103		15.568	0.000
SYN 702	0.007	-0.118	0.085	Regression	0.000	1	0.000	0.053	0.823	Session	-0.002	0.009	-0.081	-0.231	0.823
				Residual	0.057	8	0.007			(Constant)	1.412	0.058		24.394	0.000
SYN 1001	1.000	.	.	Regression	0.052	1	0.052	.	.	Session	0.321	0.000	1.000	.	.
				Residual	0.000	0	.			(Constant)	0.747	0.000		.	.
SYN 1302	0.026	-0.217	0.230	Regression	0.006	1	0.006	0.107	0.760	Session	-0.018	0.055	-0.161	-0.327	0.760
				Residual	0.212	4	0.053			(Constant)	1.125	0.215		5.245	0.006
SYN 1402	0.138	0.031	0.127	Regression	0.021	1	0.021	1.285	0.290	Session	-0.016	0.014	-0.372	-1.133	0.290
				Residual	0.128	8	0.016			(Constant)	1.133	0.086		13.097	0.000
SYN 1601	0.061	-0.127	0.101	Regression	0.003	1	0.003	0.325	0.593	Session	0.011	0.010	0.247	0.570	0.593
				Residual	0.051	5	0.010			(Constant)	1.233	0.085		14.424	0.000
SYN 1701	0.088	-0.026	0.182	Regression	0.025	1	0.025	0.768	0.406	Session	-0.018	0.020	-0.296	-0.877	0.406
				Residual	0.265	8	0.033			(Constant)	1.773	0.124		14.273	0.000
SYN 1801	0.654	0.538	0.092	Regression	0.048	1	0.048	5..661	0.098	Session	-0.069	0.029	-0.808	-2.379	0.098
				Residual	0.026	3	0.009			(Constant)	1.187	0.097		12.274	0.001
SYN 1901	0.128	-0.163	0.194	Regression	0.017	1	0.017	0..439	0.555	Session	-0.041	0.061	-0.357	-0.663	0.555
				Residual	0.113	3	0.038			(Constant)	0.905	0.204		4.443	0.021
SYN 1904	1.000	.	.	Regression	0.001	1	0.001	.	.	Session	0.034	0.000	1.000	.	.
				Residual	0.000	0	.			(Constant)	1.204	0.000		.	.
SYN 2001	0.637	0.591	0.067	Regression	0.062	1	0.062	14.02	0.006	Session	-0.027	0.007	-0.798	-3745.000	0.006
				Residual	0.035	8	0.004			(Constant)	1.401	0.045		30.833	0.000
SYN 2101	0.715	0.667	0.116	Regression	0.201	1	0.201	15.03	0.008	Session	-0.069	0.018	-0.845	-3.877	0.008
				Residual	0.080	6	0.013			(Constant)	0.999	0.090		11.084	0.000
SYN 2301	0.461	0.385	0.320	Regression	0.616	1	0.616	5.99	0.044	Session	0.101	0.041	0.679	2.449	0.044
				Residual	0.719	7	0.103			(Constant)	0.721	0.233		3.097	0.017
SYN 2502	0.546	0.489	0.188	Regression	0.339	1	0.339	9.607	0.015	Session	-0.064	0.021	-0.739	-3.099	0.015
				Residual	0.282	8	0.035			(Constant)	1.126	0.128		8.774	0.000
SYN 2601	0.228	0.117	0.144	Regression	0.043	1	0.043	2.065	0.194	Session	-0.027	0.019	-0.477	-1.437	0.194
				Residual	0.146	7	0.021			(Constant)	1.196	0.105		11.407	0.000
SYN 2602	0.214	0.115	0.137	Regression	0.041	1	0.041	2.175	0.178	Session	-0.022	0.015	-0.462	-1.475	0.178
				Residual	0.149	8	0.019			(Constant)	1.209	0.093		12.945	0.000
SYN 3001	1.000	.	.	Regression	0.015	1	0.015	.	.	Session	0.172	0.000	1.000	.	.
				Residual	0.000	0	.			(Constant)	1.018	0.000		.	.
SYN 3203	1.000	.	.	Regression	0.004	1	0.004	.	.	Session	-0.089	0.000	-1.000	.	.
				Residual	0.000	0	.			(Constant)	1.456	0.000		.	.
SYN 3204	0.250	0.157	0.094	Regression	0.023	1	0.023	2.671	0.141	Session	-0.017	0.010	-0.500	-1.634	0.141
				Residual	0.070	8	0.009			(Constant)	1.425	0.064		22.302	0.000
SYN 3401	0.873	0.746	0.027	Regression	0.005	1	0.005	6.887	0.232	Session	0.050	0.019	0.934	2.624	0.232
				Residual	0.001	1	0.001			(Constant)	1.038	0.041		25.220	0.025
SYN 3501	0.002	-0.123	0.144	Regression	0.000	1	0.000	0.014	0.910	Session	0.002	0.016	0.041	0.117	0.910
				Residual	0.166	8	0.021			(Constant)	0.952	0.098		9.676	0.000
SYN 3502	0.289	0.200	0.095	Regression	0.029	1	0.029	3.252	0.109	Session	0.019	0.010	0.538	1.803	0.109
				Residual	0.072	8	0.009			(Constant)	0.910	0.065		14.003	0.000
SYN 3602	0.347	0.216	0.137	Regression	0.050	1	0.05	2.655	0.164	Session	-0.042	0.026	0.589	-1.630	0.164
				Residual	0.094	5	0.019			(Constant)	1.399	0.116		12.054	0.000
SYN 3702	0.270	0.179	0.135	Regression	0.054	1	0.054	2.96	0.124	Session	0.026	0.015	0.520	1.721	0.124
				Residual	0.145	8	0.018			(Constant)	0.713	0.092		7.751	0.000
SYN 3703	0.774	0.547	0.049	Regression	0.008	1	0.008	3.417	0.316	Session	-0.063	0.034	-0.880	-1.848	0.316
				Residual	0.002	1	0.002			(Constant)	1.134	0.074		15.286	0.042
SYN 3901	0.032	-0.162	0.063	Regression	0.001	1	0.001	0.165	0.702	Session	0.005	0.012	0.179	0.406	0.702
				Residual	0.020	5	0.004			(Constant)	1.481	0.053		27.887	0.000
SYN 4003	0.687	0.624	0.075	Regression	0.062	1	0.062	10.96	0.021	Session	-0.047	0.014	-0.829	-3.311	0.021
				Residual	0.028	5	0.006			(Constant)	1.580	0.064		24.853	0.000
SYN 4101	0.633	0.587	0.108	Regression	0.161	1	0.161	13.8	0.006	Session	-0.044	0.012	-0.796	-3.714	0.006
				Residual	0.094	8	0.012			(Constant)	1.642	0.074		22.210	0.000

SNY 4102	0.001	-0.124	0.080	Regression	0.000	1	0.000	0.008	0.933	Session	0.001	0.009	0.031	0.087	0.933
				Residual	0.051	8	0.006			(Constant)	1.214	0.055		22.214	0.000
SNY 4402	0.391	0.304	0.105	Regression	0.050	1	0.050	4.496	0.072	Session	-0.029	0.014	-0.625	-2.120	0.072
				Residual	0.077	7	0.011			(Constant)	1.539	0.076		20.189	0.000
SYN 4502	0.142	0.034	0.147	Regression	0.029	1	0.029	1.319	0.284	Session	-0.019	0.016	-0.376	-1.148	0.284
				Residual	0.173	8	0.022			(Constant)	1.747	0.101		17.371	0.000
SYN 4801	0.433	0.352	0.076	Regression	0.031	1	0.031	5.352	0.054	Session	-0.023	0.010	-0.658	-2.313	0.054
				Residual	0.040	7	0.006			(Constant)	1.251	0.055		22.782	0.000
SYN 4901	1.000	.	.	Regression	0.003	1	0.003	.	.	Session	-0.073	0.010	-1.000	.	.
				Residual	0.000	0	.			(Constant)	1.637	0.000		.	.
SYN 5001	0.844	0.689	0.199	Regression	0.215	1	0.215	5.421	0.258	Session	0.328	0.141	0.919	2.328	0.258
				Residual	0.040	1	0.040			(Constant)	0.370	0.304		1.217	0.438
SYN 5101	0.429	0.315	0.048	Regression	0.009	1	0.009	3.758	0.110	Session	0.018	0.009	0.655	1.938	0.110
				Residual	0.011	5	0.002			(Constant)	0.983	0.040		24.298	0.000
SYN 5202	0.037	0.123	0.174	Regression	0.007	1	0.007	0.233	0.647	Session	0.013	0.027	0.193	0.482	0.647
				Residual	0.181	6	0.030			(Constant)	1.288	0.136		9.508	0.000
SYN 5301	0.345	0.236	0.186	Regression	0.109	1	0.109	3.163	0.126	Session	-0.051	0.029	0.588	1.779	0.126
				Residual	0.207	6	0.035			(Constant)	1.120	0.145		7.733	0.000
SYN 5402	0.213	0.114	0.119	Regression	0.031	1	0.031	2.159	0.180	Session	-0.019	0.013	-0.461	-1.469	0.180
				Residual	0.113	8	0.014			(Constant)	1.623	0.081		19.972	0.000
SYN 5503	0.406	0.321	0.077	Regression	0.028	1	0.028	4.789	0.065	Session	-0.022	0.010	-0.637	-2.188	0.065
				Residual	0.041	7	0.006			(Constant)	0.930	0.056		16.694	0.000
SYN 5701	0.245	0.094	0.037	Regression	0.002	1	0.002	1.622	0.259	Session	0.009	0.007	0.495	1.273	0.259
				Residual	0.007	5	0.001			(Constant)	1.063	0.032		33.628	0.000
SYN 5702	0.253	0.103	0.055	Regression	0.005	1	0.005	1.689	0.250	Session	-0.013	0.010	-0.503	-1.300	0.250
				Residual	0.015	5	0.003			(Constant)	1.328	0.046		28.821	0.000
SYN 5901	1.000	.	.	Regression	0.015	1	0.015	.	.	Session	-0.171	0.000	-1.000	.	.
				Residual	0.000	0	.			(Constant)	1.256	0.000		.	.
SYN 5903	0.549	0.492	0.139	Regression	0.187	1	0.187	9.723	0.014	Session	-0.048	0.015	-0.741	-3.118	0.014
				Residual	0.154	8	0.019			(Constant)	1.235	0.095		13.034	0.000
SYN 6001	0.771	0.742	0.065	Regression	0.115	1	0.115	26.93	0.001	Session	-0.037	0.007	-0.878	-5.189	0.001
				Residual	0.034	8	0.004			(Constant)	1.526	0.045		34.163	0.000
SYN 6002	0.116	0.005	0.151	Regression	0.024	1	0.024	1.047	0.336	Session	-0.017	0.017	-0.340	-1.023	0.336
				Residual	0.183	8	0.023			(Constant)	1.273	0.103		12.310	0.000
SYN 6003	0.434	0.363	0.117	Regression	0.084	1	0.084	6.133	0.038	Session	-0.032	0.013	-0.659	-2.476	0.038
				Residual	0.110	8	0.014			(Constant)	1.413	0.080		17.623	0.000
SYN 6101	0.002	-0.122	0.111	Regression	0.000	1	0.000	0.019	0.892	Session	-0.002	0.012	-0.049	-0.140	0.892
				Residual	0.098	8	0.012			(Constant)	0.894	0.076		11.810	0.000
SYN 6201	1.000	.	.	Regression	0.147	1	0.147	.	.	Session	0.542	0.000	1.000	.	.
				Residual	0.000	0	.			(Constant)	0.199	0.000		.	.
SYN 6202	1.000	.	.	Regression	0.043	1	0.043	.	.	Session	0.292	0.000	1.000	.	.
				Residual	0.000	0	.			(Constant)	0.587	0.000		.	.
SYN 6204	0.115	-0.107	0.234	Regression	0.028	1	0.028	0.517	0.512	Session	0.040	0.056	0.338	0.719	0.512
				Residual	0.220	4	0.055			(Constant)	1.268	0.218		5.810	0.004
SYN 6601	0.480	0.306	0.029	Regression	0.002	1	0.002	2.767	0.195	Session	-0.016	0.009	-0.693	-1.663	0.195
				Residual	0.003	3	0.001			(Constant)	1.216	0.031		39.344	0.000
SYN 6702	1.000	.	.	Regression	0.006	1	0.006	.	.	Session	-0.108	0.000	-1.000	.	.
				Residual	0.000	0	.			(Constant)	1.125	0.000		.	.
SYN 6801	0.464	0.356	0.109	Regression	0.052	1	0.052	4.320	0.092	Session	-0.043	0.021	-0.681	-2.078	0.092
				Residual	0.060	5	0.012			(Constant)	1.302	0.093		14.074	0.000
SYN 6901	0.240	0.145	0.096	Regression	0.023	1	0.023	2.524	0.151	Session	-0.017	0.011	-0.490	-1.589	0.151
				Residual	0.074	8	0.009			(Constant)	1.513	0.066		23.039	0.000
SYN 6902	0.405	0.331	0.090	Regression	0.044	1	0.044	5.452	0.048	Session	0.023	0.010	0.637	2.335	0.048
				Residual	0.065	8	0.008			(Constant)	1.075	0.061		17.484	0.000
SYN 7001	0.291	0.150	0.174	Regression	0.062	1	0.062	2.055	0.211	Session	0.047	0.033	0.540	1.433	0.211
				Residual	0.152	5	0.030			(Constant)	1.074	0.147		7.298	0.001
SYN 7002	0.475	0.370	0.115	Regression	0.060	1	0.06	4.528	0.087	Session	-0.046	0.022	0.689	-2.128	0.087
				Residual	0.066	5	0.013			(Constant)	1.320	0.097		13.569	0.000
SYN 7301	0.083	-0.032	0.136	Regression	0.013	1	0.013	0.725	0.419	Session	-0.013	0.015	-0.288	-0.851	0.419
				Residual	0.148	8	0.018			(Constant)	1.226	0.093		13.202	0.000
SYN 7302	0.162	0.057	0.144	Regression	0.032	1	0.032	1.541	0.250	Session	-0.020	0.016	-0.402	-1.242	0.250
				Residual	0.167	8	0.021			(Constant)	1.209	0.099		12.255	0.000
SYN 7401	0.684	0.605	0.113	Regression	0.110	1	0.11	8.662	0.042	Session	-0.079	0.027	-0.827	-2.943	0.042
				Residual	0.051	4	0.013			(Constant)	1.374	0.105		13.076	0.000
SYN 7701	0.620	0.544	0.093	Regression	0.071	1	0.071	8.169	0.035	Session	-0.050	0.018	-0.788	-2.858	0.035
				Residual	0.044	5	0.009			(Constant)	1.284	0.079		16.257	0.000
SYN 7801	0.325	0.190	0.191	Regression	0.088	1	0.088	2.407	0.181	Session	-0.056	0.036	-0.570	-1.551	0.181
				Residual	0.182	5	0.036			(Constant)	1.722	0.161		10.682	0.000
SYN 7802	0.001	-0.165	0.163	Regression	0.000	1	0.000	0.007	0.934	Session	0.002	0.025	0.035	0.086	0.934
				Residual	0.159	6	0.026			(Constant)	1.384	0.127		10.910	0.000
SYN 8101	0.387	0.300	0.144	Regression	0.091	1	0.091	4.426	0.073	Session	-0.039	0.019	-0.622	-2.104	0.073
				Residual	0.144	7	0.021			(Constant)	1.534	0.104		14.709	0.000
SYN 8301	0.288	0.199	0.156	Regression	0.079	1	0.079	3.233	0.110	Session	-0.031	0.017	-0.536	-1.798	0.110
				Residual	0.195	8	0.024			(Constant)	1.491	0.107		13.973	0.000
SYN 8302	0.007	-0.117	0.137	Regression	0.001	1	0.001	0.057	0.818	Session	0.004	0.015	0.084	0.238	0.818
				Residual	0.151	8	0.019			(Constant)	1.432	0.094		15.245	0.000
SYN 8401	1.000	.	.	Regression	0.000	1	0.001	.	.	Session	-0.019	0.000	-1.000	.	.

				Residual	0.000	0	.		.	(Constant)	1.240	0.000		.	.
SYN 8402	1.000	.	.	Regression	0.007	1	0.007	.	.	Session	-0.117	0.000	-1.000	.	.
				Residual	0.000	0	.		.	(Constant)	1.673	0.000		.	.
SYN 8502	0.195	0.094	0.121	Regression	0.028	1	0.028	1.936	0.202	Session	0.019	0.013	0.441	1.392	0.202
				Residual	0.117	8	0.015			(Constant)	1.175	0.083		14.204	0.000
SYN 8601	0.482	0.418	0.214	Regression	0.341	1	0.341	7.453	0.026	Session	-0.064	0.024	-0.694	-2.730	0.026
				Residual	0.366	8	0.046			(Constant)	1.939	0.146		13.277	0.000
SYN 8602	0.887	0.873	0.087	Regression	0.474	1	0.474	62.92	0.000	Session	-0.076	0.010	-0.942	-7.932	0.000
				Residual	0.060	8	0.008			(Constant)	1.733	0.059		29.245	0.000
SYN 8602	0.887	0.873	0.087	Regression	0.474	1	0.474	62.92	0.000	Session	-0.076	0.010	-0.942	-7.932	0.000
				Residual	0.060	8	0.008			(Constant)	1.733	0.059		29.245	0.000
SYN 8902	0.008	-0.157	0.139	Regression	0.001	1	0.001	0.048	0.834	Session	0.005	0.021	0.089	0.219	0.834
				Residual	0.115	6	0.019			(Constant)	0.851	0.108		7.883	0.000
SYN 9101	0.662	0.577	0.070	Regression	0.038	1	0.038	7.823	0.049	Session	-0.047	0.017	-0.813	-2.797	0.049
				Residual	0.020	4	0.005			(Constant)	1.156	0.065		17.768	0.000
SYN 9501	0.171	0.032	0.213	Regression	0.056	1	0.056	1.234	0.309	Session	0.037	0.033	0.413	1.111	0.309
				Residual	0.273	6	0.045			(Constant)	1.110	0.166		6.681	0.001
SYN 9801	0.611	0.533	0.119	Regression	0.111	1	0.111	7.854	0.038	Session	0.063	0.022	0.782	2.802	0.038
				Residual	0.071	5	0.014			(Constant)	1.686	0.101		16.761	0.000

Note: Independent variable is Session. Table 1 indicates best linear curve fit coefficients for N = 79 dyads. *R square* represents the proportion of the variance for movements synchrony per dyad explained by the number of sessions as the independent variable or variables in the regression model. *Adj R-square* adjusts the statistic based on the number of independent variables in the model. *Std. Error of Est.* is the estimated standard deviation of an estimate measuring the uncertainty associated with the estimate. Standard errors are calculated from observed data. *Sum of squares* measures how far individual measurements are from the mean. *df* indicates the number of degrees of freedom of values that are free to vary and is defined as the minimum number of independent coordinates that can specify the position of the system completely. *Mean square* is the mean squared error and shows how close a regression line is to a set of points. *F* statistic is a value in ANOVA to find out if the means between two populations are significantly different. *Sig. / p-value* indicates statistical significance and refers to the claim that a result from data generated by the experimentation is not likely to occur randomly. *Unstand B* is the unstandardized beta which represents the slope of the line between movement synchrony per dyad and thenumber of sessions. Unstand. CoStE represents the average distance that the observed values deviate from the regression line. *Standardized Coef. Std. Error* represents the standard error and measures the precision of the estimate of the coefficient. *Stand. Coef. Beta* indicates estimates resulting from the regression analysis where the underlying data have been standardized so that the variances of the number of sessions and movement synchrony per dyad are equal to 1. *t* is the t-statistic which represents the ratio of the departure of the estimated value of a parameter from its hypothesized value to its standard error.

Table 5.6.

Cluster Dyads with Non-Linear Curve Fit

		Model Summary			ANOVA					Coefficients					
											Unstandardized coefficients		Standardized coefficients		
		R Square	Adj R Square	Std. Error of Est.		Sum of squares	df	Mean Square	F	Sig. / p-value		B	Coeff. St. Error	Beta	t	Sig.
SYN 101	cubic	0.717	0.575	0.133	Regression	0.270	3	0.090	5.055	0.044	Session	-0.723	0.194	-10.696	-3.724	0.010
					Residual	0.107	6	0.018			Session ** 2	0.139	0.040	23.289	3.483	0.013
											Session ** 3	-0.008	0.002	-13.237	-3.282	0.017
											(Constant)	2.056	0.259		7.943	0.000
SYN 201	cubic	0.263	-0.843	0.163	Regression	0.019	3	0.006	0.238	0.865	Session	-0.316	0.672	-4.908	-0.470	0.684
					Residual	0.053	2	0.027			Session ** 2	0.124	0.215	13.811	0.578	0.621
											Session ** 3	-0.013	0.020	-9.142	-0.650	0.582
											(Constant)	1.106	0.589		1.877	0.201
SYN 202	cubic	0.445	-0.387	0.087	Regression	0.012	3	0.004	0.535	0.703	Session	0.434	0.358	10.975	1.212	0.349
					Residual	0.015	2	0.008			Session ** 2	-0.138	0.115	-25.028	-1.208	0.350
											Session ** 3	0.013	0.011	14.633	1.200	0.353
											(Constant)	0.756	0.314		2.406	0.138
SYN 502	quadratic	0.121	-0.130	0.155	Regression	0.023	2	0.012	0.483	0.636	Session	-0.062	0.076	-1.286	-0.813	0.443
					Residual	0.168	7	0.024			Session ** 2	0.006	0.007	1.448	0.916	0.390
											(Constant)	1.485	0.182		8.142	0.000
SYN 602	cubic	0.191	-0.213	0.186	Regression	0.049	3	0.016	0.473	0.712	Session	0.314	0.271	5.622	1.159	0.291
					Residual	0.208	6	0.035			Session ** 2	-0.063	0.056	-12.751	-1.129	0.302
											Session ** 3	0.004	0.003	7.268	1.067	0.327
											(Constant)	0.974	0.361		2.698	0.036
SYN 701	cubic	0.254	-0.119	0.119	Regression	0.029	3	0.01	0.681	0.595	Session	-0.230	0.173	-6.206	-1.332	0.231
					Residual	0.085	6	0.014			Session ** 2	0.044	0.036	13.349	1.231	0.264
											Session ** 3	-0.002	0.002	-7.285	-1.114	0.308
											(Constant)	1.685	0.231		7.309	0.000
SYN 801	cubic	0.056	-0.416	0.156	Regression	0.009	3	0.003	0.119	0.946	Session	0.120	0.227	2.780	0.531	0.615
					Residual	0.146	6	0.024			Session ** 2	-0.022	0.047	-5.715	-0.468	0.656
											Session ** 3	0.001	0.003	3.016	0.410	0.696
											(Constant)	0.789	0.303		2.605	0.040
SYN 901	cubic	0.143	-0.286	0.246	Regression	0.060	3	0.020	0.333	0.802	Session	0.274	0.357	3.825	0.766	0.473
					Residual	0.362	6	0.060			Session ** 2	-0.065	0.074	-10.192	-0.877	0.414
											Session ** 3	0.004	0.004	6.571	0.937	0.385
											(Constant)	1.309	0.477		2.748	0.033
SYN 1101	cubic	0.980	0.950	0.029	Regression	0.083	3	0.028	32.749	0.03	Session	-0.673	0.119	-9.668	-5.633	0.030
					Residual	0.002	2	0.001			Session ** 2	0.238	0.038	24.431	6.220	0.025
											Session ** 3	-0.025	0.004	-15.792	-6.827	0.021
											(Constant)	2.090	0.105		19.935	0.003
SYN 1201	cubic	0.713	0.425	0.092	Regression	0.063	3	0.021	2.481	0.238	Session	0.244	0.270	4.341	0.905	0.432
					Residual	0.025	3	0.008			Session ** 2	-0.103	0.076	-14.949	-1.354	0.269
											Session ** 3	0.010	0.006	10.638	1.622	0.203
											(Constant)	1.126	0.267		4.211	0.024
SYN 1202	cubic	0.247	-0.884	0.302	Regression	0.060	3	0.020	0.218	0.878	Session	0.733	1.240	6.231	0.591	0.615
					Residual	0.183	2	0.091			Session ** 2	-0.267	0.397	-16.252	-0.673	0.570
											Session ** 3	0.027	0.038	10.156	0.714	0.549
											(Constant)	0.983	1.089		0.903	0.462
SYN 1301	quadratic	0.883	0.805	0.070	Regression	0.111	2	0.056	11.331	0.040	Session	0.363	0.082	4.281	4.430	0.021
					Residual	0.015	3	0.005			Session ** 2	-0.054	0.011	-4.535	-4.693	0.018
											(Constant)	0.715	0.125		5.709	0.011
SYN 1401	quadratic	0.526	0.210	0.073	Regression	0.018	2	0.009	1.663	0.327	Session	-0.145	0.086	-3.280	-1.685	0.191
					Residual	0.016	3	0.005			Session ** 2	0.022	0.012	3.488	1.792	0.171
											(Constant)	0.979	0.131		7.467	0.005
SYN 1501	cubic	0.981	0.953	0.06	Regression	0.376	3	0.125	34.998	0.028	Session	-2.085	0.246	-14.088	-8.479	0.014
					Residual	0.007	2	0.004			Session ** 2	0,606	0.079	29.281	7.702	0.016
											Session ** 3	0.007	0.007	-15.322	-6.843	0.021
											(Constant)	0.216	0.216		16.900	0,003
SYN 1802	cubic	1.000	.	.	Regression	0.028	3	0.009	.	.	Session	0.663	0.000	8.866	.	.
					Residual	0.000	0	.			Session ** 2	-0.251	0.000	-17.069	.	.
											Session ** 3	0.032	0.000	9.348	.	.
											(Constant)	0.663	0.000		.	.
SYN 1902	quadratic	0.337	-0.327	0.161	Regression	0.026	2	0.013	0.507	0.663	Session	0.262	0.263	2.965	0.996	0.424
					Residual	0.052	2	0.026			Session ** 2	-0.041	0.043	-2.823	-0.948	0.443
											(Constant)	0.469	0.345		1.358	0.307
SYN 1903	quadratic	0.866	0.731	0.079	Regression	0.08	2	0.040	6.439	0.134	Session	0.432	0.129	4.491	3.352	0.079
					Residual	0.012	2	0.006			Session ** 2	-0.075	0.021	-4.739	-3.536	0.071
											(Constant)	0.543	0.169		3.210	0.085
SYN 2201	cubic	0.723	0.515	0.064	Regression	0.042	3	0.014	3.477	0.130	Session	-0.401	0.142	-10.781	-2.835	0.047
					Residual	0.016	4	0.004			Session ** 2	0,092	0.036	22.834	2.596	0.060
											Session ** 3	-0.006	0.003	-12.189	-2.318	0.081
											(Constant)	1.750	0.156		11.185	0,000
SYN 2202	cubic	0.564	0.236	0.198	Regression	0.202	3	0.067	1.721	0.300	Session	-0.784	0.441	-8.483	-1.777	0.150
					Residual	0.156	4	0.039			Session ** 2	0,218	0.111	21.756	1.971	0.120
											Session ** 3	-0.016	0.008	-13.326	-2.020	0.114
											(Constant)	1.878	0.487		3.855	0,018
SYN 2401	quadratic	0.649	0.549	0.102	Regression	0.134	2	0.067	6.472	0.026	Session	-0.180	0.050	-3.594	-3.597	0.009
					Residual	0.073	7	0.010			Session ** 2	0.015	0.004	3.491	3.494	0.010
											(Constant)	1.739	0.120		14.513	0.000
SYN 2501	cubic	0.335	0.002	0.105	Regression	0.033	3	0.011	1.006	0.452	Session	0.224	0.152	6.467	1.470	0.192
					Residual	0.066	6	0.011			Session ** 2	-0.051	0.031	-16.486	-1.609	0.159
											Session ** 3	0.003	0.002	10.139	1.641	0.152
											(Constant)	0.884	0.203		4.350	0.005
SYN 2701	quadratic	0.454	0.298	0.062	Regression	0.023	2	0.011	2.913	0.12	Session	0.071	0.031	2.900	2.328	0.053
					Residual	0.027	7	0.004			Session ** 2	-0.007	0.003	-3.004	-2.411	0.047
											(Constant)	1.390	0.073		18.982	0.000
SYN 2801	cubic	0.802	0.604	0.107	Regression	0.140	3	0.047	4.054	0.140	Session	0.336	0.314	4.264	1.071	0.363
					Residual	0.034	3	0.011			Session ** 2	-0.115	0.088	-11.886	-1.297	0.285
											Session ** 3	0.011	0.007	8.538	1.569	0.215
											(Constant)	0.850	0.311		2.732	0.072
SYN 2802	cubic	0.571	0.314	0.143	Regression	0.137	3	0.046	2.222	0.204	Session	0.511	0.254	8.079	2.009	0.101
					Residual	0.103	5	0.021			Session ** 2	-0.116	0.058	-18.879	-2.023	0.099
											Session ** 3	0.008	0.004	11.595	2.068	0.093

											(Constant)	0.416	0.310		1.342	0.237
SYN 2901	quadratic	0.265	-0.225	0.145	Regression	0.023	2	0.011	0.541	0.630	Session	0.119	0.170	1.706	0.704	0.532
					Residual	0.063	3	0.021			Session ** 2	-0.020	0.024	-2.049	-0.845	0.460
											(Constant)	1.005	0.259		3.876	0.030
SYN 3002	cubic	0.304	-0.043	0.122	Regression	0.039	3	0.013	0.875	0.504	Session	-0.219	0.178	-5.552	-1.234	0.263
					Residual	0.089	6	0.015			Session ** 2	0.052	0.037	14.882	1.421	0.205
											Session ** 3	-0.003	0.002	-9.497	-1.503	0.183
											(Constant)	1.644	0.237		6.942	0.000
SYN 3101	quadratic	0.481	0.308	0.142	Regression	0.112	2	0.056	2.779	0.140	Session	0.163	0.083	2.611	1.962	0.097
					Residual	0.121	6	0.020			Session ** 2	-0.013	0.008	-2.162	-1.624	0.155
											(Constant)	0.596	0.180		3.304	0.016
SYN 3201	cubic	0.081	-0.379	0.145	Regression	0.011	3	0.004	0.176	0.909	Session	0.146	0.211	3.590	0.694	0.513
					Residual	0.126	6	0.021			Session ** 2	-0.031	0.043	-8.675	-0.720	0.498
											Session ** 3	0.002	0.003	5.201	0.716	0.501
											(Constant)	1.116	0.281		3.971	0.007
SYN 3202	cubic	0.264	-0.178	0.210	Regression	0.079	3	0.026	0.597	0.644	Session	-0.418	0.373	-5.904	-1.120	0.313
					Residual	0.221	5	0.044			Session ** 2	0.081	0.084	11.776	0,963	0.380
											Session ** 3	-0.005	0.006	-6.036	-0.822	0.449
											(Constant)	2.081	0.455		4.575	0,006
SYN 3301	quadratic	0.982	0.965	0.006	Regression	0.005	2	0.002	55.544	0.018	Session	0.106	0.011	4.847	9.973	0.010
					Residual	0.000	2	0.000			Session ** 2	-0.018	0.002	-5.076	-10.444	0.009
											(Constant)	1.308	0.014		94.214	0.000
SYN 3302	cubic	0.990	0.960	0.023	Regression	0.052	3	0.017	33.147	0.127	Session	1.450	0.148	19.933	9.824	0.065
					Residual	0.001	1	0.001			Session ** 2	-0.518	0.055	-43.593	-9.465	0.067
											Session ** 3	0.055	0.006	24.302	9.067	0,070
											(Constant)	0.194	0.133		1.715	0,336
SYN 3501	quadratic	0.023	-0.256	0.152	Regression	0.004	2	0.002	0.084	0.921	Session	0.031	0.075	0.681	0.408	0.695
					Residual	0.162	7	0.023			Session ** 2	-0.003	0.007	-0.656	-0.394	0.706
											(Constant)	0.895	0.179		4.995	0.002
SYN 3601	quadratic	0.259	-0.235	0.089	Regression	0.008	2	0.004	0.524	0.638	Session	0.084	0.104	1.966	0.808	0.478
					Residual	0.024	3	0.008			Session ** 2	-0.013	0.015	-2.237	-0.919	0.426
											(Constant)	1.083	0.159		6.792	0.007
SYN 3701	cubic	0.578	0.367	0.161	Regression	0.212	3	0.071	2.739	0.136	Session	0.338	0.234	5.066	1.446	0.198
					Residual	0.155	6	0.026			Session ** 2	-0.092	0.048	-15.555	-1.906	0.105
											Session ** 3	0.006	0.003	10.503	2.134	0.077
											(Constant)	0.560	0.312		1.796	0.123
SYN 3801	cubic	0.703	0.481	0.087	Regression	0.071	3	0.024	3.161	0.148	Session	0.489	0.193	9.939	2.526	0.065
					Residual	0.030	4	0.008			Session ** 2	-0.136	0.049	-25.572	-2.810	0.048
											Session ** 3	0.011	0.004	16.079	2.956	0.042
											(Constant)	0.838	0.214		3.919	0.017
SYN 4001	quadratic	0.840	0.519	0.179	Regression	0.168	2	0.084	2.619	0.400	Session	1.017	0.455	5.075	2.232	0.268
					Residual	0.032	1	0.032			Session ** 2	-0.205	0.090	-5.198	-2.286	0.262
											(Constant)	0.303	0.499		0.606	0.653
SYN 4002	quadratic	0.64	0.496	0.087	Regression	0.068	2	0.034	4.446	0.078	Session	-0.173	0.062	-3.438	-2.780	0.039
					Residual	0.038	5	0.008			Session ** 2	0.017	0.007	3.067	2.480	0.056
											(Constant)	1.733	0.122		14.231	0.000
SYN 4201	quadratic	0.463	0.194	0.248	Regression	0.212	2	0.106	1.722	0.289	Session	0.313	0.222	2.444	1.411	0.231
					Residual	0.246	4	0.062			Session ** 2	-0.044	0.027	-2.831	-1.634	0.178
											(Constant)	0.986	0.387		2.551	0.063
SYN 4401	quadratic	0.842	0.779	0.059	Regression	0.091	2	0.046	13.303	0.010	Session	0.111	0.042	2.192	2.673	0.044
					Residual	0.017	5	0.003			Session ** 2	-0.016	0.005	-2.924	-3.566	0.016
											(Constant)	1.306	0.082		15.990	0.000
SYN 4403	cubic	1.000	.	.	Regression	0.045	3	0.015	.	.	Session	0.504	0.000	5.289	.	.
					Residual	0.000	0	.			Session ** 2	-0.146	0.000	-7.806	.	.
											Session ** 3	0.015	0.000	3.517	.	.
											(Constant)	0.731	0.000			
SYN 4404	quadratic	0.623	0.473	0.153	Regression	0.194	2	0.097	4.138	0.087	Session	0.179	0.109	2.083	1.647	0.161
					Residual	0.117	5	0.023			Session ** 2	-0.025	0.012	-2.681	-2.119	0.088
											(Constant)	1.053	0.214		4.929	0.004
SYN 4501	quadratic	0.698	0.612	0.256	Regression	1.062	2	0.531	8.106	0.015	Session	-0.184	0.126	-1.356	-1.465	0.186
					Residual	0.459	7	0.066			Session ** 2	0.025	0.011	2.100	2.268	0.058
											(Constant)	1.534	0.301		5.096	0.001
SYN 4601	quadratic	0.503	0.361	0.107	Regression	0.080	2	0.04	3.537	0.087	Session	-0.110	0.052	-2.491	-2.094	0.075
					Residual	0.080	7	0.011			Session ** 2	0.011	0.005	2.864	2.408	0.047
											(Constant)	1.588	0.125		12.667	0.000
SYN 4602	cubic	0.528	0.291	0.145	Regression	0.141	3	0.047	2.233	0.185	Session	-0.130	0.211	-2.289	-0.617	0.560
					Residual	0.126	6	0.021			Session ** 2	0.049	0.043	9.633	1.116	0.307
											Session ** 3	-0.004	0.003	-7.416	-1.424	0.204
											(Constant)	0.971	0.281		3.451	0.014
SNY 4701	quadratic	0.583	0.464	0.103	Regression	0.103	2	0.051	4.888	0.047	Session	-0.140	0.050	-3.018	-2.771	0.028
					Residual	0.074	7	0.011			Session ** 2	0.011	0.004	2.588	2.376	0.049
											(Constant)	1.683	0.121		13.953	0.000
SYN 4702	cubic	0.222	-0.166	0.185	Regression	0.058	3	0.019	0.572	0.654	Session	-0.319	0.269	-5.644	-1.186	0.280
					Residual	0.205	6	0.034			Session ** 2	0.060	0.055	12.002	1.084	0.320
											Session ** 3	-0.003	0.003	-6.753	-1.011	0.351
											(Constant)	1.772	0.358		4.945	0.003
SYN 4802	quadratic	0.253	0.039	0.056	Regression	0.007	2	0.004	1.184	0.361	Session	-0.042	0.028	-2.231	-1.531	0.170
					Residual	0.022	7	0.003			Session ** 2	0.004	0.002	2.226	1.527	0.171
											(Constant)	1.201	0.066		18.143	0.000
SYN 5002	cubic	0.964	0.910	0.058	Regression	0.178	3	0.059	17.919	0.053	Session	0.963	0.236	9.376	4.074	0.055
					Residual	0.007	2	0.003			Session ** 2	-0.242	0.076	-16.856	-3.201	0.085
											Session ** 3	0.019	0.007	8.360	2.696	0.114
											(Constant)	-0.180	0.207		-0.866	0.478
SYN 5102	quadratic	0.465	0.287	0.095	Regression	0.047	2	0.024	2.611	0.153	Session	0.123	0.056	2.988	2.212	0.069
					Residual	0.054	6	0.009			Session ** 2	-0.011	0.005	-2.743	-2.031	0.089
											(Constant)	0.753	0.121		6.221	0.001
SYN 5201	quadratic	0.284	0.045	0.183	Regression	0.080	2	0.040	1.189	0.367	Session	-0.151	0.107	-2.203	-1.409	0.209
					Residual	0.201	6	0.034			Session ** 2	0.013	0.010	1.932	1.236	0.263
											(Constant)	1.443	0.233		6.195	0.001
SYN 5401	quadratic	0.585	0.467	0.108	Regression	0.115	2	0.058	4.938	0.046	Session	0.136	0.053	2.787	2.566	0.037
					Residual	0.082	7	0.012			Session ** 2	-0.010	0.005	-2.274	-2.094	0.075
											(Constant)	1.065	0.127		8.387	0.000
SYN 5501	quadratic	0.371	0.191	0.097	Regression	0.039	2	0.02	2.065	0.197	Session	-0.094	0.048	-2.630	-1.966	0.090
					Residual	0.066	7	0.009			Session ** 2	0.009	0.004	2.717	2.031	0.082
											(Constant)	1.215	0.114		10.624	0.000
SYN 5502	cubic	0.577	0.365	0.098	Regression	0.079	3	0.026	2.724	0.137	Session	-0.326	0.143	-7.989	-2.276	0.063
					Residual	0.058	6	0.01			Session ** 2	0.056	0.030	15.372	1.881	0.109
											Session ** 3	-0.003	0.002	-7.836	-1.590	0.163
											(Constant)	1.547	0.191		8.100	0.000
SYN 5801	cubic	0.816	0.541	0.085	Regression	0.064	3	0.021	2.963	0.263	Session	-0.840	0.347	-12.594	-2.418	0.137
					Residual	0.014	2	0.007			Session ** 2	0.245	0.111	26.308	2.207	0.158
											Session ** 3	-0.021	0.011	-13.771	-1.962	0.189
											(Constant)	2.188	0.305		7.177	0.019
SYN 5803	cubic	1.000	.	.	Regression	0.035	3	0.012	.	.	Session	-0.957	0.000	-11.444	.	.
					Residual	0.000	0	.			Session ** 2	0.525	0.000	31.895	.	.
											Session ** 3	-0.078	0.000	-20.441	.	.

											(Constant)	1.818	0.100			
SYN 5902	quadratic	0.212	-0.014	0.129	Regression	0.031	2	0.016	0.939	0.435	Session	-0.083	0.063	-1.959	-1.308	0.232
					Residual	0.116	7	0.017			Session ** 2	0.008	0.006	2.046	1.366	0.214
											(Constant)	1.241	0.151		8.207	0.000
SYN 6103	quadratic	0.270	0.027	0.121	Regression	0.032	2	0.016	1.112	0.388	Session	-0.098	0.071	-2.189	-1.387	0.215
					Residual	0.088	6	0.015			Session ** 2	0.010	0.007	2.326	1.474	0.191
											(Constant)	1.232	0.154		8.017	0.000
SYN 6203	quadratic	0.935	0.909	0.060	Regression	0.256	2	0.128	35.852	0.001	Session	-0.315	0.043	-3.896	-7.401	0.001
					Residual	0.018	5	0.004			Session ** 2	0.037	0.005	4.273	8.117	0.000
											(Constant)	1.504	0.083		18.043	0.000
SYN 6301	quadratic	0.696	0.493	0.075	Regression	0.038	2	0.019	3.428	0.168	Session	-0.109	0.088	-1.936	-1.241	0.303
					Residual	0.017	3	0.006			Session ** 2	0.021	0.012	2.629	1.686	0.190
											(Constant)	1.336	0.134		9.970	0.002
SYN 6302	quadratic	0.541	0.311	0.058	Regression	0.016	2	0.008	2.357	0.211	Session	0.111	0.052	3.403	2.126	0.101
					Residual	0.014	4	0.003			Session ** 2	-0.014	0.006	-3.476	-2.171	0.096
											(Constant)	1.114	0.091		12.277	0.000
SYN 6401	cubic	0.796	0.491	0.12	Regression	0.113	3	0.038	2.606	0.289	Session	-0.740	0.494	-8.210	-1.497	0.273
					Residual	0.029	2	0.014			Session ** 2	0.288	0.158	22.863	1.822	0.210
											Session ** 3	-0.031	0.015	-15.266	-2.065	0.175
											(Constant)	1.901	0.434		4.383	0.048
SYN 6402	cubic	0.956	0.890	0.066	Regression	0.189	3	0.063	14.498	0.065	Session	-0.716	0.271	-6.741	-2.646	0.118
					Residual	0.009	2	0.004			Session ** 2	0.306	0.087	20.582	3.530	0.072
											Session ** 3	-0.034	0.008	-14.394	-4.192	0.052
											(Constant)	1.451	0.237		6.109	0.026
SYN 6403	quadratic	0.643	0.464	0.094	Regression	0.063	2	0.032	3.597	0.128	Session	0.176	0.084	2.977	2.108	0.103
					Residual	0.035	4	0.009			Session ** 2	-0.017	0.010	-2.414	-1.709	0.163
											(Constant)	0.551	0.146		3.774	0.020
SYN 6501	quadratic	0.382	0.205	0.158	Regression	0.109	2	0.054	2.163	0.186	Session	-0.143	0.078	-2.437	-1.839	0.109
					Residual	0.176	7	0.025			Session ** 2	0.011	0.007	2.086	1.574	0.160
											(Constant)	1.808	0.186		9.703	0.000
SYN 6502	quadratic	0.402	0.162	0.078	Regression	0.021	2	0.010	1.678	0.277	Session	0.099	0.056	2.826	1.772	0.137
					Residual	0.031	5	0.006			Session ** 2	-0.010	0.006	-2.597	-1.629	0.164
											(Constant)	1.196	0.109		10.950	0.000
SYN 6701	cubic	0.687	0.498	0.063	Regression	0.044	3	0.015	3.650	0.099	Session	0.292	0.112	8.976	2.611	0.048
					Residual	0.020	5	0.004			Session ** 2	-0.073	0.025	-23.128	-2.898	0.034
											Session ** 3	0.005	0.002	14.214	2.964	0.031
											(Constant)	0.912	0.136		6.681	0.001
SYN 6802	cubic	0.967	0.917	0.030	Regression	0.052	3	0.017	19.512	0.049	Session	-0.624	0.122	-11.277	-5.106	0.036
					Residual	0.002	2	0.001			Session ** 2	0.221	0.039	28.518	5.642	0.030
											Session ** 3	-0.021	0.004	-17.046	-5.727	0.029
											(Constant)	1.466	0.107		13.668	0.005
SYN 7101	cubic	0.777	0.442	0.103	Regression	0.073	3	0.024	2.323	0.315	Session	1.014	0.422	13.793	2.404	0.138
					Residual	0.021	2	0.011			Session ** 2	-0.305	0.135	-29.659	-2.259	0.152
											Session ** 3	0.027	0.013	16.669	2.155	0.164
											(Constant)	0.489	0.370		1.322	0.317
SYN 7102	cubic	0.742	-0.034	0.193	Regression	0.107	3	0.036	0.956	0.618	Session	-1.821	1.240	-15.175	-1.468	0.381
					Residual	0.037	1	0.037			Session ** 2	0.676	0.460	34.450	1.468	0.381
											Session ** 3	-0.075	0.051	-20.192	-1.479	0.379
											(Constant)	2.779	0.949		2.929	0.209
SYN 7501	quadratic	0.737	0.605	0.059	Regression	0.039	2	0.019	5.600	0.069	Session	-0.138	0.053	-3.184	-2.627	0.058
					Residual	0.014	4	0.003			Session ** 2	0.014	0.006	2.580	2.128	0.100
											(Constant)	1.508	0.092		16.424	0.000
SYN 7601	quadratic	0.267	-0.027	0.086	Regression	0.014	2	0.007	0.909	0.461	Session	0.082	0.061	2.372	1.344	0.237
					Residual	0.037	5	0.007			Session ** 2	-0.009	0.007	-2.272	-1.287	0.254
											(Constant)	0.675	0.120		5.612	0.002
SYN 7602	quadratic	0.537	0.405	0.049	Regression	0.020	2	0.010	4.062	0.067	Session	0.045	0.024	2.126	1.853	0.106
					Residual	0.017	7	0.002			Session ** 2	-0.005	0.002	-2.629	-2.291	0.056
											(Constant)	1.023	0.058		17.633	0.000
SYN 7901	cubic	0.705	0.410	0.109	Regression	0.085	3	0.028	2.392	0.246	Session	0.480	0.318	-7.335	-1.509	0.228
					Residual	0.035	3	0.012			Session ** 2	0.098	0.089	12.210	1.092	0.355
											Session ** 3	-0.006	0.007	-5.345	-0.805	0.480
											(Constant)	2.072	0.315		6.573	0.007
SYN 7902	quadratic	0.842	0.737	0.079	Regression	0.100	2	0.050	7.998	0.063	Session	0.359	0.093	4.344	3.867	0.031
					Residual	0.019	3	0.006			Session ** 2	-0.052	0.013	-4.486	-3.994	0.028
											(Constant)	0.732	0.000		5.166	0.014
SYN 8001	quadratic	0.208	-0.109	0.135	Regression	0.024	2	0.012	0.655	0.559	Session	-0.105	0.096	-2.002	-1.091	0.325
					Residual	0.091	5	0.018			Session ** 2	0.010	0.010	1.817	0.990	0.368
											(Constant)	1.541	0.188		8.182	0.001
SYN 8002	quadratic	1.000	.	.	Regression	0.104	2	0.052	.	.	Session	1.599	0.000	7.000	.	.
					Residual	0.000	0	.			Session ** 2	-0.391	0.000	-6.917	.	.
											(Constant)	0.110	0.000		.	.
SYN 8201	quadratic	0.790	0.649	0.025	Regression	0.007	2	0.003	5.630	0.096	Session	-0.090	0.029	-4.038	-3.115	0.053
					Residual	0.002	3	0.001			Session ** 2	0.011	0.004	3.623	2.794	0.068
											(Constant)	1.108	0.044		25.145	0.000
SYN 8202	quadratic	0.658	0.430	0.091	Regression	0.047	2	0.024	2.885	0.200	Session	-0.237	0.106	-3.698	-2.237	0.111
					Residual	0.025	3	0.008			Session ** 2	0.030	0.015	3.325	2.011	0.138
											(Constant)	1.188	0.162		7.332	0.005
SYN 8403	cubic	0.373	-0.253	0.363	Regression	0.236	3	0.079	0.596	0.660	Session	-1.077	1.065	-7.170	-1.012	0.386
					Residual	0.396	3	0.132			Session ** 2	0.337	0.299	18.346	1.125	0.342
											Session ** 3	-0.030	0.025	-11.654	-1.203	0.315
											(Constant)	2.207	1.055		2.091	0.128
SYN 8701	cubic	0.501	0.003	0.161	Regression	0.079	3	0.026	1.006	0.498	Session	0.777	0.473	10.390	1.644	0.199
					Residual	0.078	3	0.026			Session ** 2	-0.228	0.133	-24.974	-1.717	0.184
											Session ** 3	0.019	0.011	14.924	1.728	0.183
											(Constant)	0.641	0.469		1.369	0.265
SYN 8702	quadratic	0.964	0.893	0.040	Regression	0.042	2	0.021	13.492	0.189	Session	-0.522	0.101	-5.573	-5.192	0.121
					Residual	0.002	1	0.002			Session ** 2	0.102	0.020	5.520	5.142	0.122
											(Constant)	1.488	0.110		13.507	0.047
SYN 8801	quadratic	0.978	0.956	0.055	Regression	0.272	2	0.136	44.482	0.022	Session	-0.175	0.090	-1.052	-1.941	0.192
					Residual	0.006	2	0.003			Session ** 2	0.054	0.015	2.000	3.690	0.066
											(Constant)	1.141	0.119		9.628	0.011
SYN 8802	cubic	0.998	0.993	0.015	Regression	0.130	3	0.043	185.028	0.054	Session	1.626	0.098	14.253	16.529	0.038
					Residual	0.000	1	0.000			Session ** 2	-0.595	0.037	-31.910	-16.303	0.039
											Session ** 3	0.067	0.004	18.836	16.536	0.038
											(Constant)	-0.026	0.075		-0.340	0.791
SYN 8901	cubic	0.654	0.481	0.119	Regression	0.160	3	0.053	3.776	0.078	Session	0.292	0.173	5.352	1.686	0.143
					Residual	0.085	6	0.014			Session ** 2	-0.071	0.036	-14.657	-1.983	0.095
											Session ** 3	0.005	0.002	10.080	2.261	0.064
											(Constant)	1.139	0.231		4.933	0.003
SYN 9001	quadratic	0.211	-0.014	0.166	Regression	0.052	2	0.026	0.937	0.436	Session	0.105	0.082	1.934	1.291	0.238
					Residual	0.193	7	0.028			Session ** 2	-0.010	0.007	-2.037	-1.360	0.216
											(Constant)	1.016	0.195		5.198	0.001
SYN 9101	quadratic	0.833	0.667	0.076	Regression	0.058	2	0.029	4.998	0.167	Session	0.367	0.124	4.403	2.950	0.098
					Residual	0.012	2	0.006			Session ** 2	-0.063	0.020	-4.648	-3.114	0.089
											(Constant)	1.101	0.163		6.747	0.021
SYN 9201	cubic	0.867	0.787	0.109	Regression	0.388	3	0.129	10.836	0.013	Session	0.939	0.194	10.875	4.850	0.005
					Residual	0.060	5	0.012			Session ** 2	-0.229	0.044	-27.196	-5.225	0.003
											Session ** 3	0.015	0.003	16.442	5.258	0.003
											(Constant)	0.265	0.236		1.125	0.312
SYN 9301	cubic	0.761	0.401	0.050	Regression	0.016	3	0.005	2.118	0.337	Session	0.325	0.205	9.433	1.587	0.254
					Residual	0.050	2	0.002			Session ** 2	-0.099	0.066	-20.567	-1.512	0.270
											Session ** 3	0.009	0.006	12.151	1.516	0.269
											(Constant)	0.637	0.180		3.540	0.071

SYN 9302	quadratic	0.277	-0.084	0.073	Regression	0.008	2	0.004	0.767	0.523	Session	-0.079	0.065	-2.454	-1.222	0.289
					Residual	0.021	4	0.005			Session ** 2	0.009	0.008	2.313	1.151	0.314
											(Constant)	1.343	0.113		11.882	0.000
SYN 9402	cubic	0.501	0.201	0.091	Regression	0.041	3	0.014	1.672	0.287	Session	-0.324	0.160	-8.773	-2.022	0.099
					Residual	0.041	5	0.008			Session ** 2	0.065	0.036	18.040	1.791	0.133
											Session ** 3	-0.004	0.002	-9.669	-1.598	0.171
											(Constant)	1.537	0.196		7.854	0.001
SYN 9403	cubic	0.148	-0.277	0.098	Regression	0.010	3	0.003	0.349	0.792	Session	-0.111	0.143	-3.859	-0.775	0.468
					Residual	0.058	6	0.01			Session ** 2	0.025	0.029	9.950	0.859	0.424
											Session ** 3	-0.002	0.002	-6.068	-0.868	0.419
											(Constant)	1.088	0.190		5.722	0.001
SYN 9601	cubic	0.371	-0.257	0.225	Regression	0.090	3	0.030	0.591	0.662	Session	-0.750	0.660	-8.071	-1.138	0.338
					Residual	0.152	3	0.051			Session ** 2	0.190	0.186	16.746	1.025	0.381
											Session ** 3	-0.015	0.015	-9.214	-0.950	0.412
											(Constant)	2.045	0.654		3.127	0.052
SYN 9701	cubic	1.000	.	.	Regression	0.095	3	0.032	.	.	Session	-3.410	0.000	-24.709	.	.
					Residual	0.000	0	.			Session ** 2	1.412	0.000	51.970	.	.
											Session ** 3	-0.175	0.000	-27.724	.	.
											(Constant)	3.874	0.000		.	.
SYN 9901	quadratic	1.000	1.000	0.002	Regression	0.096	2	0.048	9.584	0.007	Session	0.786	0.006	5.677	138.407	0.005
					Residual	0.000	1	0.000			Session ** 2	-0.153	0.001	-5.613	-136.847	0.005
											(Constant)	0.372	0.006		59.679	0.011

Note: Independent variable is Session. Table 5.6 indicates best linear curve fit coefficients for $N = 94$ dyads. *R square* represents the proportion of the variance for movements synchrony per dyad explained by the number of sessions as the independent variable or variables in the regression model. *Adj R-square* adjusts the statistic based on the number of independent variables in the model. *Std. Error of Est.* is the estimated standard deviation of an estimate measuring the uncertainty associated with the estimate. *Standard errors* are calculated from observed data. *Sum of squares* measures how far individual measurements are from the mean. *df* indicates the number of degrees of freedom of values that are free to vary and is defined as the minimum number of independent coordinates that can specify the position of the system completely. *Mean square* is the mean squared error and shows how close a regression line is to a set of points. *F* statistic is a value in ANOVA to find out if the means between two populations are significantly different. *Sig. / p-value* indicates statistical significance and refers to the claim that a result from data generated by the experimentation is not likely to occur randomly. *Unstand B* is the unstandardized beta which represents the slope of the line between movement synchrony per dyad and thenumber of sessions. *Unstand. CoStE* represents the average distance that the observed values deviate from the regression line. S*tandardized Coef. Std. Error* represents the standard error and measures the precision of the estimate of the coefficient. *Stand. Coef. Beta* indicates estimates resulting from the regression analysis where the underlying data have been standardized so that the variances of the number of sessions and movement synchrony per dyad are equal to 1. *t* is the t-statistic which represents the ratio of the departure of the estimated value of a parameter from its hypothesized value to its standard error.

Table 5.7.

Mean Linear and Non-Linear Curve Fit - All Sessions

Model Summary				ANOVA					Coefficients				
									Unstandardized coefficients		Standardized coefficients		
Curve	R Square	Adj R Square	Std. Error of Est.		Sum of squares	df	Mean Square	F	Sig. / p-value		B	Coeff. St. Error	Beta	t	Sig.
linear	0.436	0.235	0.123	Regression	0.080	1	0.080	6.653	0.265	Session	-0.001	0.018	-0.185	-53.799	0.265
				Residual	0.109	5	0.019			(Constant)	1.232	0.086		16.761	0.000
quadratic	0.561	0.346	0.104	Regression	0.091	2	0.046	6.560	0.245	Session	0,082	0.086	0.450	3.365	0.171
				Residual	0.067	5	0.014			Session ** 2	-0.018	0.011	-0.480	-3.320	0.162
										(Constant)	1.115	0.146		12.108	0.030
cubic	0.587	0.222	0.121	Regression	0.092	3	0.031	9.250	0.359	Session	-0.100	0.291	-0.733	0.173	0.230
				Residual	0.075	3	0.020			Session **2	0.029	0.082	1.658	-0.205	0.220
										Session **3	-0.004	0.007	-0.865	0.198	0.221
										(Constant)	1.211	0.299		4.656	0.106

Note: Mean curve fit for linear, cubic and quadratic curves for all sessions. *R square* represents the proportion of the variance for movements synchrony per dyad explained by the number of sessions as the independent variable in the regression model. *Adj R-square* adjusts the statistic based on the number of independent variables in the model. *Std. Error of Est.* is the estimated standard deviation of an estimate measuring the uncertainty associated with the estimate. Standard errors are calculated from observed data. *Sum of squares* measures how far individual measurements are from the mean. *df* indicates the number of degrees of freedom of values that are free to vary and is defined as the minimum number of independent coordinates that can specify the position of the system completely. *Mean square* is the mean squared error and shows how close a regression line is to a set of points. *F* statistic is a value in ANOVA to find out if the means between two populations are significantly different. *Sig. / p-value* indicates statistical significance and refers to the claim that a result from data generated by the experimentation is not likely to occur randomly. *Unstand B* is the unstandardized beta which represents the slope of the line between movement synchrony per dyad and thenumber of sessions. *Unstand. CoStE* represents the average distance that the observed values deviate from the regression line. *Standardized Coef. Std. Error* represents the standard error and measures the precision of the estimate of the coefficient. *Stand. Coef. Beta* indicates estimates resulting from the regression analysis where the underlying data have been standardized so that the variances of the number of sessions and movement synchrony per dyad are equal to 1. *t* is the t-statistic which represents the ratio of the departure of the estimated value of a parameter from its hypothesized value to its standard error.

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a.) Personal statement

As a professional full-time executive coach, I am inspired to ***promote best practice*** in coaching at organisations and ***take responsibility*** in ***developing the profession*** as a whole. In doing so, I am looking for ways to develop my own practice. Contributing as a researcher is about ***joining the global thinking*** regarding the future of coaching both as a business and profession. Research enhances our understanding and informs our practice. We need ***deep understanding of what works*** for our clients, after all it is our clients that we are ***committed to serve***. Therefore, those who wish to serve clients need to be aware of what research is telling us about what is merely some ***flights of fancy,*** or what is ***data-based***. It also creates opportunities for deep reflection and learning with a ***ripple-effect***.

b.) Professional profile

For 10+ years now, I have been working as an external executive coach for middle and executive management, and most recently C Suite executives. Additionally, I am a Director of Professional Development, Research and Ethics at ICF Chapter Austria and a Co-Lead for Global ICF Coaching Science Community of Practice to foster the applicability of science in coaching and leadership.

The research project in this thesis was awarded a Harvard Grant with Institute of Coaching, McLean's Hospital, a Harvard Medical School Associate for its innovative research design using artificial intelligence and human interactions to measure outcomes. The project was also accredited by ICF (International Coaching Federation).

Today, there are two books in publication:

- *Coaching Science Practitioner Handbook*, a compilation of transformational story telling provided by research participants. It targets coaches, career development and HR by Applied Sciences Publishing – July 2020: www.coachingsciencehandbook.com
- *Coaching Presence: Understanding the power of nun-verbal relationship* to be published by McGraw Hill Publishing - March 2021